Chapter 6: Shadows

A. INTRODUCTION

This chapter assesses the potential for the Proposed Actions to cast new shadows that would adversely impact sunlight-sensitive resources. Following the guidelines of the 2021 *City Environmental Quality Review (CEQR) Technical Manual*, sunlight-sensitive resources include publicly accessible parks and open space, sunlight-sensitive features of historic resources, and natural resources that depend on sunlight. Therefore, this section is closely linked to the data and assessments presented in Chapter 5, "Open Space," Chapter 7, "Historic and Cultural Resources," and Chapter 9, "Natural Resources."

In accordance with the *CEQR Technical Manual*, an assessment of shadows is required if proposed actions would result in new structures 50 feet or more in height, or of any height if the project site is located adjacent to, or across the street from, a sunlight-sensitive resource. As detailed in Chapter 1, "Project Description," the Reasonable Worst-Case Development Scenario (RWCDS) identifies 67 development sites (52 projected development sites and 15 potential development sites) within the Project Area. The Proposed Actions could result in new buildings that are greater than 50 feet in height as compared to the buildings that could be developed in the No Action condition. In addition, some of these buildings would be adjacent to or across the street from sunlight-sensitive resources. Therefore, a shadows analysis was prepared to determine the potential for development resulting from the Proposed Actions to cause significant adverse shadow impacts to sunlight-sensitive resources.

PRINCIPAL CONCLUSIONS

The shadows analysis concluded that new shadows resulting from the Proposed Actions would fall on dozens of sunlight-sensitive resources (primarily parks, pedestrian plazas, and Greenstreets medians) located in Long Island City, on Roosevelt Island, and on the East Midtown waterfront of Manhattan, but in the vast majority of cases the extent and/or duration of new shadow would be limited and would not cause significant adverse impacts. However, the new shadows would be extensive enough to cause significant adverse impacts to three open space resources in Long Island City: several Greenstreets medians in Queens Plaza South between Vernon Boulevard and 13th Street; Gordon Triangle, a small public open space located on 44th Drive between Vernon Boulevard and 10th Street; and the 44th Drive Pier, a public open space located at the western end of 44th Drive.

B. DEFINITIONS AND METHODOLOGY

This analysis has been prepared in accordance with New York City CEQR procedures and follows the guidelines of the 2021 *CEQR Technical Manual*.

DEFINITIONS

Incremental shadow is the additional, or new, shadow that a structure resulting from a proposed project would cast on a sunlight-sensitive resource.

Sunlight-sensitive resources are those that depend on sunlight or for which direct sunlight is necessary to maintain the resource's usability or architectural integrity. Such resources generally include the following:

- *Public open space* such as parks, beaches, playgrounds, plazas, schoolyards (if open to the public during non-school hours), greenways, and landscaped medians with seating. Planted areas within unused portions of roadbeds that are part of the Greenstreets program are also considered sunlight-sensitive resources.
- *Features of architectural resources that depend on sunlight for their enjoyment by the public.* Only the sunlight-sensitive features need be considered, as opposed to the entire resource. Such sunlight-sensitive features might include: design elements that depend on the contrast between light and dark (e.g., recessed balconies, arcades, deep window reveals); elaborate, highly carved ornamentation; stained glass windows; historic landscapes and scenic landmarks; and features for which the effect of direct sunlight is described as playing a significant role in the structure's importance as a historic landmark.
- *Natural resources* where the introduction of shadows could alter the resource's condition or microclimate. Such resources could include community gardens, surface water bodies, wetlands, and designated resources such as coastal fish and wildlife habitats.

Non-sunlight-sensitive resources include, for the purposes of CEQR:

- *City streets and sidewalks* (except Greenstreets);
- *Private open space* (e.g., front and back yards, stoops, vacant lots, and any private, non-publicly accessible open space); and
- *Project-generated open space,* which cannot experience a significant adverse shadow impact from the project, according to CEQR, because without the project the open space would not exist. However, a discussion of how shadows would affect the new space may be warranted.

A significant adverse shadow impact occurs when the incremental shadow added by a proposed project falls on a sunlight-sensitive resource and substantially reduces or completely eliminates direct sunlight, thereby significantly altering the public's use of the resource or threatening the viability of vegetation or other resources. Each case must be considered on its own merits based on the extent and duration of new shadow and an analysis of the resource's sensitivity to reduced sunlight.

METHODOLOGY

Following the guidelines of the *CEQR Technical Manual*, a preliminary screening assessment must first be conducted to ascertain whether a project's shadow could reach any sunlight-sensitive resources at any time of year. The preliminary screening assessment consists of three tiers of analysis. The first tier of analysis determines a simple radius around the proposed building representing the longest shadow that could be cast. If there are sunlight-sensitive resources within this radius, the analysis proceeds

to the second tier, which refines the area that could be affected by project shadow. This refinement accounts for the fact that shadows can never be cast between a certain range of angles south of the development site due to the path of the sun through the sky at the latitude of New York City.

If the second tier of analysis does not eliminate the possibility of new shadows on sunlight-sensitive resources, a third tier of screening analysis further refines the area that could be reached by project shadow by looking at specific representative days in each season and using three-dimensional (3D) computer modeling to determine the maximum extent of shadow over the course of each representative day.

If a third tier of analysis does not eliminate the possibility of new shadows on sunlight-sensitive resources, a detailed shadow analysis is required to determine the extent and duration of the incremental shadow resulting from the project. The detailed analysis provides the data needed to assess the shadow impacts. The effects of the new shadows on the sunlight-sensitive resources are described, and their degree of significance compared to shadows anticipated under No Action development is considered. The results of the analysis and assessment are documented with graphics, a table of incremental shadow durations, and narrative text.

C. PRELIMINARY SCREENING ASSESSMENT

A base map was developed using Geographic Information Systems (GIS)[1] showing the location of the 67 development sites and the surrounding street layout and topography (see **Figure 6-1**). Mapped databases of parks and other public open spaces, city, state, and national historic resources, and natural resources were added to the map.[2] In coordination with the open space, historic and cultural resources, and natural resources assessments presented in other chapters of the environmental impact statement (EIS), potential sunlight-sensitive resources were identified and shown on the map. Open space resources include publicly accessible parks, community gardens, Greenstreets traffic medians, pedestrian plazas, and privately owned publicly accessible plazas, courtyards, and other spaces available to the public. Sunlight-sensitive features of historic buildings and sites include stained-glass windows, design elements that rely on the contrast of light and shadow, vegetation in historic landscapes, and features for which direct sunlight is described as playing an important role in the resource's significance.

Projected and potential developments expected as a result of the Proposed Actions could occur on 67 sites within the Project Area. The maximum building height for each projected and potential development is shown in **Appendix A**. To ensure a conservative analysis, additional height was added to each projected and potential development site to allow for rooftop bulkheads and other mechanical structures. This site-specific additional height, ranging from 25 to 40 feet depending on the number of stories and other factors, is also

[1] Software: Esri ArcGIS Pro 3.3

[2] Data: City, State, and Federal agencies including New York City Parks Department; New York City Office of Technology & Innovation (OTI), New York City Department of City Planning, New York City Landmarks Preservation Commission, New York City Department of Transportation, New York State Office of Parks, Recreation, and Historic Preservation, New York State Dept. of Environmental Conservation (NYSDEC), U.S. Fish and Wildlife Service, and others; supplemented by Nearmap hi-resolution imagery, and AKRF site visits.

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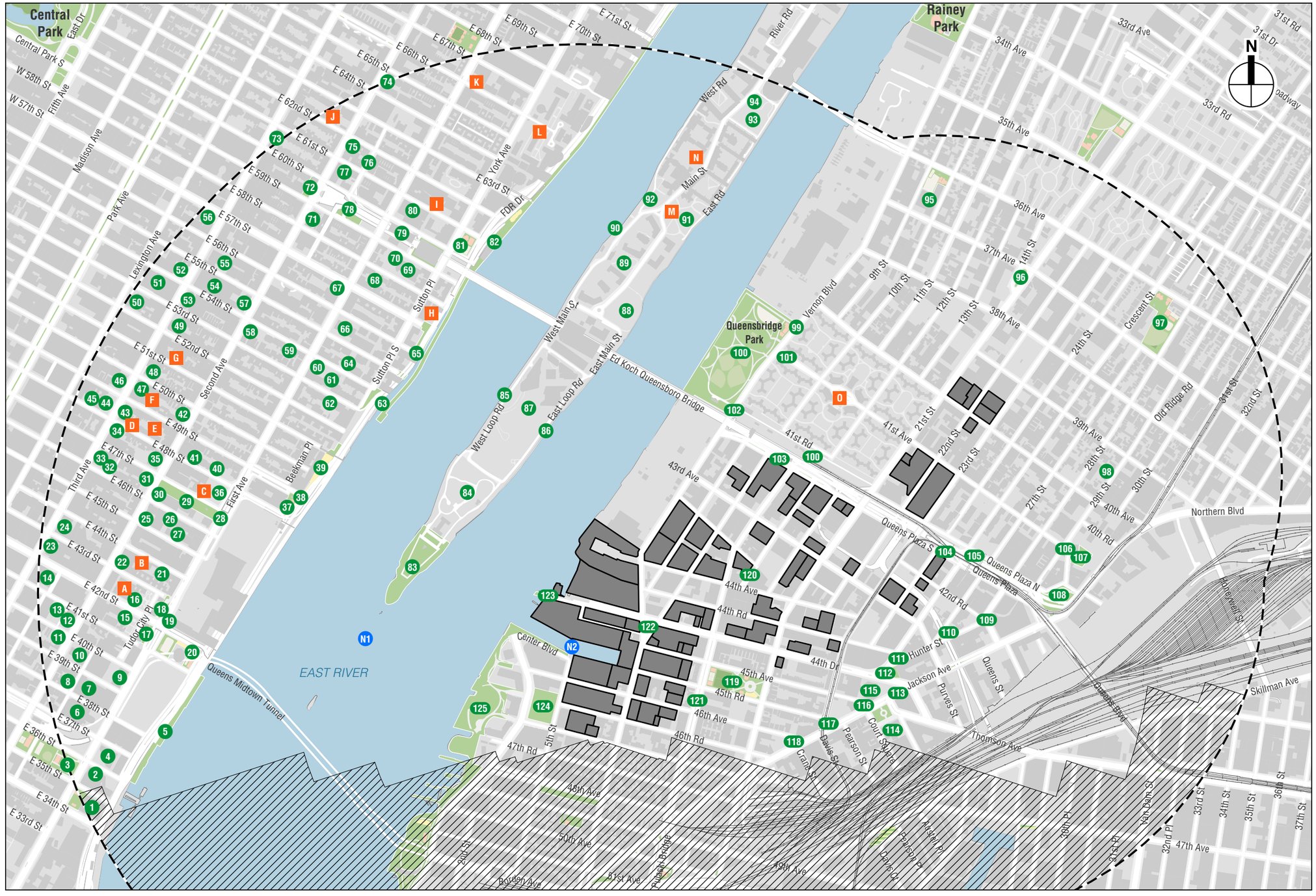

Projected and Potential Development Sites

Tier 1: Elevation-Based Study Area Perimeter

Tier 2: Area South of Development Sites That Could Never Be Shaded

Publicly Accessible Open Spaces (refer to Table 6-1)

Historic Resources with Sunlight-Sensitive Features (refer to Table 6-1)

Natural Resources (refer to Table 6-1)

Notes: The Tier 1 elevation-based study area represents a conservative preliminary study area because it assumes the maximum elevation of each projected or proposed development casting its longest shadow (occurring 90 minutes after sunrise on December 21) onto a surrounding flat surface at 0' NAVD88, which is approximately the mean tidal elevation of the nearby East River. Shadows falling on upland areas would be shorter. See Chapter 6, "Shadows," Section C "Tier 1 Screening Assessment" for details.

Tier 1 and Tier 2 Assessments

Figure 6-1

shown in **Appendix A**. All 67 development sites were conservatively included in the shadow study, regardless of the incremental height increase relative to the No Action condition, in which the development sites either remain as they are currently in existing conditions or are assumed to be redeveloped under existing zoning (see **Appendix A** for the site-by-site maximum heights under the No Action condition).

TIER 1 SCREENING ASSESSMENT

For the Tier 1 assessment, the longest shadow that a proposed development could cast is calculated; using this length as the radius, a perimeter is drawn around the development site. Anything outside this perimeter representing the longest possible shadow could not be affected by project-generated shadow, while anything inside the perimeter needs additional assessment.

According to the *CEQR Technical Manual*, the longest shadow that a structure can cast at the latitude of New York City occurs on December 21, the winter solstice, at the start of the analysis day (90 minutes after sunrise[3]) and is equal to 4.3 times the height of the structure.

It must also be noted and accounted for that shadows cast from a location at a higher elevation toward a location at a lower elevation (i.e., "downhill") are longer in horizontal distance than they would be on a flat plane, and vice versa. By the same token, shadows cast from upland areas onto the surface of the river, which is at a lower elevation (approximately 0 feet NAVD88[4]), would be longer than they would be on a flat plane.

Therefore, for each of the 67 development sites, the assessment conservatively used the maximum elevation above sea level (0 feet NAVD88) rather than maximum height above ground level at the site to calculate the longest possible shadow. The ground elevation for each development site was assigned conservatively by using either the highest elevation along the site boundary, or, if the site was in (or partially in) a flood zone[5], the Design Flood Elevation (DFE), which for the Project Area was either 13 or 14' feet NAVD88 depending on the zone. For the three sites that had a maximum ground elevation of under 13 feet, but were just outside the flood zone, the number was conservatively bumped up to 13 feet.

In summary, in order to generate a conservative study area for the initial Tier 1 assessment, the maximum elevation for each projected and potential development site incorporated the reasonable worst-case height of the development *plus* rooftop mechanical space *plus* the maximum ground elevation above sea level.

For each site, the maximum elevation was multiplied by 4.3 (as referenced above) to determine the longest shadow it could cast. Then, using this longest-shadow length as the radius, a perimeter was drawn around each of the development sites. Finally, all 67

[3] As explained in more detail below in the "Tier 3 Screening Assessment" section, shadows occurring within 90 minutes of sunrise or sunset are not considered significant under CEQR.

[4] North American Vertical Datum of 1988. Zero feet NAVD88 is approximately mean sea level in the vicinity of New York City.

[5] The 1 percent annual chance (i.e. 100-year) floodplain, using the preliminary 2015 FEMA flood map data

individual longest shadow study areas were merged. **Figure 6-1** illustrates the combined longest shadow study area determined by the Tier 1 assessment.

The Tier 1 assessment showed that many resources with sun-sensitive features were located in the longest shadow study area. Therefore, the potential for new shadows on sunlight-sensitive resources could not be eliminated, and the next tier of assessment was warranted.

TIER 2 SCREENING ASSESSMENT

Because of the path that the sun travels across the sky in the northern hemisphere, no shadow can be cast in a triangular area south of any given development site. In New York City this area lies between -108 and +108 degrees from true north. **Figure 6-1** illustrates this excluded area south of the 67 development sites. In many cases, the triangular area south of one given site would be north of another development site located farther south. Only areas too far south to be shaded by *any* development site were determined to belong in the excluded Tier 2 area. The complementary portion of the longest shadow study area represents the remaining study area that could potentially experience new project-generated shadow. A total of 142 sunlight-sensitive resources were identified within the remaining portion of the Tier 2 longest shadow study area, including 125 existing open spaces (parks, playgrounds, Greenstreets medians, and privately owned publicly accessible spaces), 15 historic resources with sunlight-sensitive features, and portions of the East River and Anable Basin, which are sunlight-sensitive natural resources. Eighty-two of the open spaces are located on the east side of Manhattan; most of these are privately owned publicly accessible residential or office building plazas. Another 12 open spaces are located on Roosevelt Island, and 31 are located in Long Island City. Of the 15 historic resources with sunlight-sensitive features, 12 are located in Manhattan, 2 on Roosevelt Island, and 1 in Long Island City.

These 142 resources requiring a Tier 3 assessment are listed in **Table 6-1**, along with the Tier 3 analysis results.

TIER 3 SCREENING ASSESSMENT

The direction and length of shadows vary throughout the course of the day and also differ depending on the season. To determine whether project-generated shadow could fall on sunlight-sensitive resources, 3D computer modeling software[6] was used to calculate and display the shadows on individual representative days of the year. A computer model was developed containing 3D representations of the elements in the base map used in the preceding assessments, the topographic information of the study area, and a reasonable worst-case 3D representation of the development sites. The previous Tier 1 and Tier 2 assessments assumed the maximum building height would cover the entire footprint of the development. However, the Tier 3 assessment accounts for the specific massing and setbacks of buildings on projected and potential development sites, including assumptions for rooftop mechanical structures/screens as recommended in the *CEQR Technical Manual*.

[6] Bentley MicroStation

Table 6-1
Tier 3 Assessment

Map Reference	Name	Dec. 21	March 21 / Sept. 21	May 6 / August 6	June 21
Publicly Accessible Open Spaces					
1	Rivergate POPS	No	No	No	No
2	East River Realty South POPS	No	No	No	No
3	St. Vartan Park	No	No	No	No
4	Manhattan Place POPS	No	No	No	No
5	East River Esplanade	No	No	No	No
6	Corinthian POPS	No	No	No	No
7	New York Tower POPS	No	No	No	No
8	Whitney POPS	No	No	No	No
9	East River Realty North POPS	No	No	No	No
10	Churchill POPS	No	No	No	No
11	Highpoint POPS	No	No	No	No
12	Marlborough POPS	No	No	No	No
13	Vanderbilt POPS	No	No	No	No
14	New York Helmsley Hotel POPS	No	No	No	No
15	Tudor Grove Playground	No	No	No	No
16	Mary O'Connor Playground	No	No	No	No
17	Trygve Lie Plaza	No	No	No	No
18	Ralph Bunche Park	No	No	No	No
19	Greenstreet, E. 42nd Streetand First Avenue	No	No	No	No
20	Robert Moses Playground	No	No	No	No
21	Unicef House POPS	No	No	No	No
22	International Plaza POPS	No	No	No	No
23	201 East 42 Street POPS	No	No	No	No
24	685 Third Avenue POPS	No	No	No	No
25	Delegate POPS	No	No	No	No
26	Belmont POPS	No	No	No	No
27	Lausanne POPS	No	No	No	No
28	Greenstreet, UN Plaza and E 47th Street	No	No	No	No
29	Dag Hammarskjold Plaza	No	No	No	No
30	Dag Hammarskjold Plaza POPS	No	No	No	No
31	Dag Hammarskjold Tower POPS	No	No	No	No
32	L'Ecole POPS	No	No	No	No
33	747 Third Avenue POPS	No	No	No	No
34	767 Third Avenue POPS	No	No	No	No
35	1 Dag Hammarskjold Plaza POPS	No	No	No	No
36	Trump World Tower POPS	No	No	No	No
37	Macarthur Playground	No	Potential	No	No
38	Greenstreet, E. 49th Street btw. Beekman Place and FDR Drive	No	Potential	No	No
39	Peter Detmold Park	No	Potential	No	No
40	100 United Nations Plaza POPS	No	No	No	No
41	Libya House POPS	No	No	No	No
42	Sterling Plaza POPS	No	No	No	No
43	777 Third Avenue POPS	No	No	No	No
44	780 Third Avenue POPS	No	No	No	No
45	Cosmopolitan POPS	No	No	No	No
46	800 Third Avenue POPS	No	No	No	No
47	Crystal Pavilion POPS	No	No	No	No
48	825 Third Avenue POPS	No	No	No	No
49	875 Third Avenue POPS	No	No	No	No
50	599 Lexington Avenue POPS	No	No	No	No
51	Citigroup Center POPS	No	No	No	No
52	900 Third Avenue POPS	No	No	No	No
53	885 Third Avenue POPS	No	No	No	No
54	909 Third Avenue POPS	No	No	No	No

Table 6-1
Tier 3 Assessment

Map Reference	Name	Dec. 21	March 21 / Sept. 21	May 6 / August 6	June 21
55	919 Third Avenue POPS	No	No	No	No
56	950 Third Avenue POPS	No	No	No	No
57	Brevard POPS	No	No	No	No
58	Connaught Tower POPS	No	No	No	No
59	Constance Baker Motley Recreation Center	No	No	No	No
60	Revere POPS	Potential	No	No	No
61	River Tower POPS	Potential	No	No	No
62	Rivercourt POPS	No	No	No	No
63	East Midtown Greenway	Potential	No	No	No
64	St. James Tower POPS	Potential	No	No	No
65	Sutton Place Park	Potential	No	No	No
66	Plaza 400 POPS	Potential	No	No	No
67	Morrison POPS	Potential	No	No	No
68	New Yorker East POPS	Potential	No	No	No
69	Sovereign POPS	Potential	No	No	No
70	Grand Sutton POPS	No	No	No	No
71	Landmark POPS	No	No	No	No
72	Tramway Plaza	No	No	No	No
73	Savoy POPS	No	No	No	No
74	Rio POPS	No	No	No	No
75	Paladin POPS	No	No	No	No
76	Greenstreets, Queensboro Bridge Exit btw. E. 61st Street and E. 62nd Street	No	No	No	No
77	Evansview POPS	No	No	No	No
78	Honey Locust Park	No	No	No	No
79	Queensboro Oval	No	No	No	No
80	Bridge Tower Place POPS	No	No	No	No
81	Twenty-Four Sycamores Park	No	No	No	No
82	Andrew Haswell Green Park	No	No	No	No
83	Franklin D. Roosevelt Four Freedoms Park	Potential	Potential	Potential	Potential
84	Southpoint Park	Potential	Potential	Potential	No
85	West Esplanade	Potential	No	No	No
86	East Esplanade	Potential	Potential	No	No
87	Cornell Tech POPS	Potential	Potential	No	No
88	Firefighters Field	No	No	No	No
89	Riverwalk Commons	No	No	No	No
90	Eleanor's Pier	No	No	No	No
91	Blackwell Park	No	No	No	No
92	Meditation Steps	No	No	No	No
93	Capobianco Field	No	No	No	No
94	Grandpa Al Lewis Playground	No	No	No	No
95	Spirit Playground	No	No	No	No
96	Sixteen Oaks Grove	No	No	No	No
97	Dutch Kills Playground	No	No	No	No
98	Windmill Community Garden	No	No	No	No
99	Greenstreet, Vernon Boulevard btw 41st Avenue and 40th Avenue	Potential	No	No	No
100	Queensbridge Park	Potential	Potential	Potential*	No
101	Greenstreet, Vernon Boulevard and 41st Avenue	Potential	No	No	No
102	Greenstreet, Vernon Boulevard and Queensboro Bridge	Potential	Potential	No	No
103	Greenstreets, Queens Plaza South	Potential	Potential	Potential	Potential
104	Pollinator Place Garden, Queens Plaza South	Potential	Potential	Potential	Potential
105	Queens Plaza North Greenstreets/Bikeway	Potential	Potential	Potential	Potential
106	Greenstreet, 29th Street and 41st Avenue	No	Potential	No	Potential

Table 6-1
Tier 3 Assessment

Map Reference	Name	Dec. 21	March 21 / Sept. 21	May 6 / August 6	June 21
107	Sven Park	No	Potential	No	Potential
108	Dutch Kills Green	No	No	Potential	Potential
109	Greenstreet, Hunter Street and 28th Street and 42nd Road	No	No	Potential	Potential
110	Greenstreet, Hunter Street, and 27th Street	No	No	Potential	No
111	Sundial Park	No	No	Potential	Potential
112	Rafferty Triangle	No	No	Potential	Potential
113	Jackson Avenue Medians	No	No	No	Potential
114	Court Square Park	No	No	No	Potential
115	Citicorp At Court Square POPS	No	No	No	No
116	McKenna Triangle	No	No	No	Potential
117	Short Triangle	No	No	No	Potential
118	46th Avenue Plaza	No	No	No	Potential
119	Murray Playground	Potential	Potential	Potential	Potential
120	12th Street Plaza	Potential	Potential	Potential	Potential
121	11th Street Greenstreets	Potential	Potential	Potential	Potential
122	Gordon Triangle	Potential	Potential	Potential	Potential
123	44th Drive Pier	Potential	Potential	Potential	Potential
124	Queens West Sports Field	Potential	Potential	Potential	Potential
125	Gantry Plaza	Potential	Potential	Potential	Potential
Historic Resources with Sunlight-Sensitive Features					
A	Ford Foundation	No	No	No	No
B	Beaux-Arts Apartments	No	No	No	No
C	Japan Society Headquarters	No	No	No	No
D	Lescaze House	No	No	No	No
E	Turtle Bay Gardens Historic District	No	No	No	No
F	Amster Yard	No	No	No	No
G	Greenacre Park	No	No	No	No
H	Sutton Place Historic District garden	Potential	No	No	No
I	Smith, Abigail Adams, Stable (Museum)	No	No	No	No
J	Church of Our Lady of Peace	No	No	No	No
K	St. John Nepomucene Church	No	No	No	No
L	The Rockefeller University landscape	No	No	No	No
M	Blackwell House	No	No	No	No
N	Chapel Of The Good Shepherd	No	No	No	No
O	Queensbridge Houses	Potential	Potential	Potential	Potential
Natural Resources					
N1	East River	Potential	Potential	Potential	Potential
N2	Anable Basin	Potential	Potential	Potential	Potential

Notes:
See **Figures 6-2 to 6-5** for corresponding resource locations and shadow sweeps.
In the columns representing the representative analysis dates, "No" means project-generated shadow could not reach the resource, even without accounting for intervening buildings. "Potential" means project-generated shadows could potentially reach the resource on this date and requires further assessment.
For visual convenience, resources that could not be reached by project-generated shadow on any representative date and require no further analysis are indicated by shaded rows.
* On the May 6/August 6 date, project-generated shadow could potentially reach Queensbridge "Baby" Park, a noncontiguous section of Queensbridge Park located between Queens Plaza North and the Queensbridge Houses, but not Queensbridge Park proper.

REPRESENTATIVE DAYS FOR ANALYSIS

Following the guidance of the *CEQR Technical Manual*, shadows on the summer solstice (June 21), winter solstice (December 21) and spring and fall equinoxes (March 21 and September 21, which are approximately the same in terms of shadow patterns) are

modeled to represent the range of shadows over the course of the year. An additional representative day during the growing season is also modeled, generally the day halfway between the summer solstice and the equinoxes, i.e., May 6 or August 6, which have approximately the same shadow patterns.

TIMEFRAME WINDOW OF ANALYSIS

The shadow assessment considers shadows occurring between one and a half hours after sunrise and one and a half hours before sunset. At times earlier or later than this timeframe window of analysis, the sun is down near the horizon and the sun's rays reach the Earth at very tangential angles, diminishing the amount of solar energy and producing shadows that are very long, move fast, and generally blend with shadows from existing structures. Consequently, shadows occurring outside the timeframe window of analysis are not considered significant under CEQR and their assessment is not required.

TIER 3 SCREENING ASSESSMENT RESULTS

Figures 6-2 to 6-5 illustrate the range of shadows that would occur, in the absence of intervening buildings, from the 67 projected and potential development sites on the four representative days for analysis. As they move clockwise and generally west to east over the landscape, the shadows are shown occurring approximately every 60 minutes from the start of the analysis day (90 minutes after sunrise) to the end of the analysis day (90 minutes before sunset). **Table 6-1** summarizes which analysis day or days each resource could potentially receive project-generated shadow.

The Tier 3 assessment concluded that 43 of the 125 publicly accessible open spaces, 2 of the 15 historic resources, and portions of the East River and Anable Basin could potentially receive incremental shadow on one or more of the representative analysis days, without accounting for intervening buildings and existing shadows, and these resources (indicated in **Table 6-1**) required a detailed analysis. The other sunlight-sensitive resources analyzed in the Tier 3 assessment could not receive project-generated shadow on any representative day and consequently do not require further assessment.

D. DETAILED SHADOW ANALYSIS

A detailed analysis is warranted when the screening analysis does not rule out the possibility that project-generated shadows would reach sunlight-sensitive resources. The detailed analysis establishes a baseline condition, the future without the Proposed Actions (the No Action condition) to illustrate the shadows cast by existing buildings (and other future planned buildings). This baseline is then compared to the future condition with the Proposed Actions (the With Action condition) to distinguish the additional (incremental) shadow cast by the projected and potential developments. The purpose of the detailed analysis is to determine the extent and duration of new incremental shadow that would be cast on a sunlight-sensitive resource as a result of the Proposed Actions. Because buildings in the existing No Action condition may already cast shadows on a sunlight-sensitive resource, the Proposed Actions may not result in additional, or incremental, shadows on that resource.

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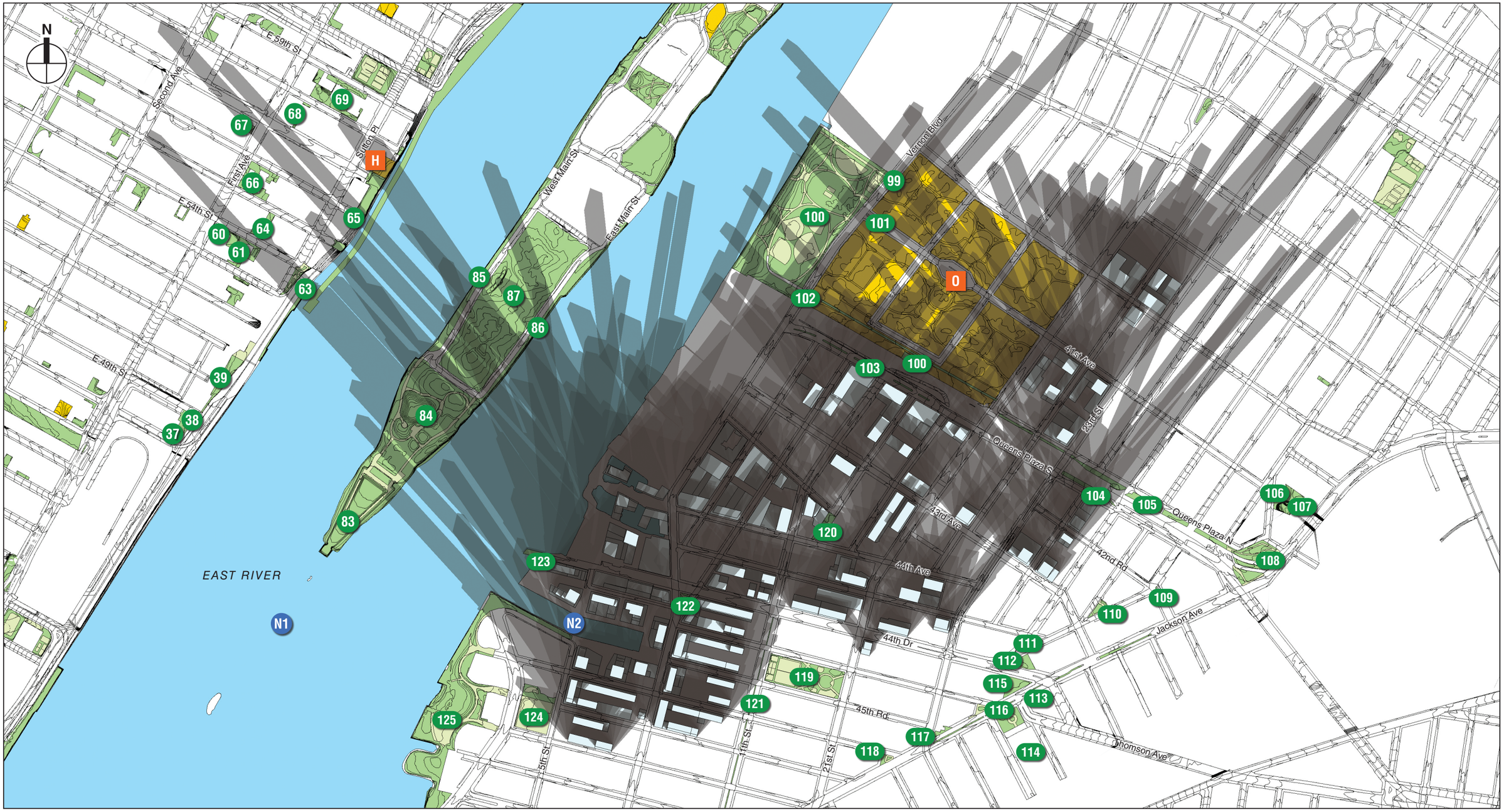

Development Sites

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

This figure illustrates the range of shadows that would occur from the Proposed Project on the analysis day representing the winter. The shadows are shown occurring approximately every 60 minutes from the start of the analysis day (90 minutes after sunrise) to the end of the analysis day (90 minutes before sunset). The Tier 3 assessment does not account for future No Action shadows, and the shadows shown in this figure do not represent incremental shadows. The Tier 3 assessment serves to illustrate the daily path or "sweep" of the proposed building's shadows across the landscape, indicating which resources could potentially be affected on that analysis day, absent intervening buildings, by project-generated shadow. Daylight Saving Time was not used, per *CEQR Technical Manual* guidelines.

Tier 3 Assessment:
December 21
Figure 6-2

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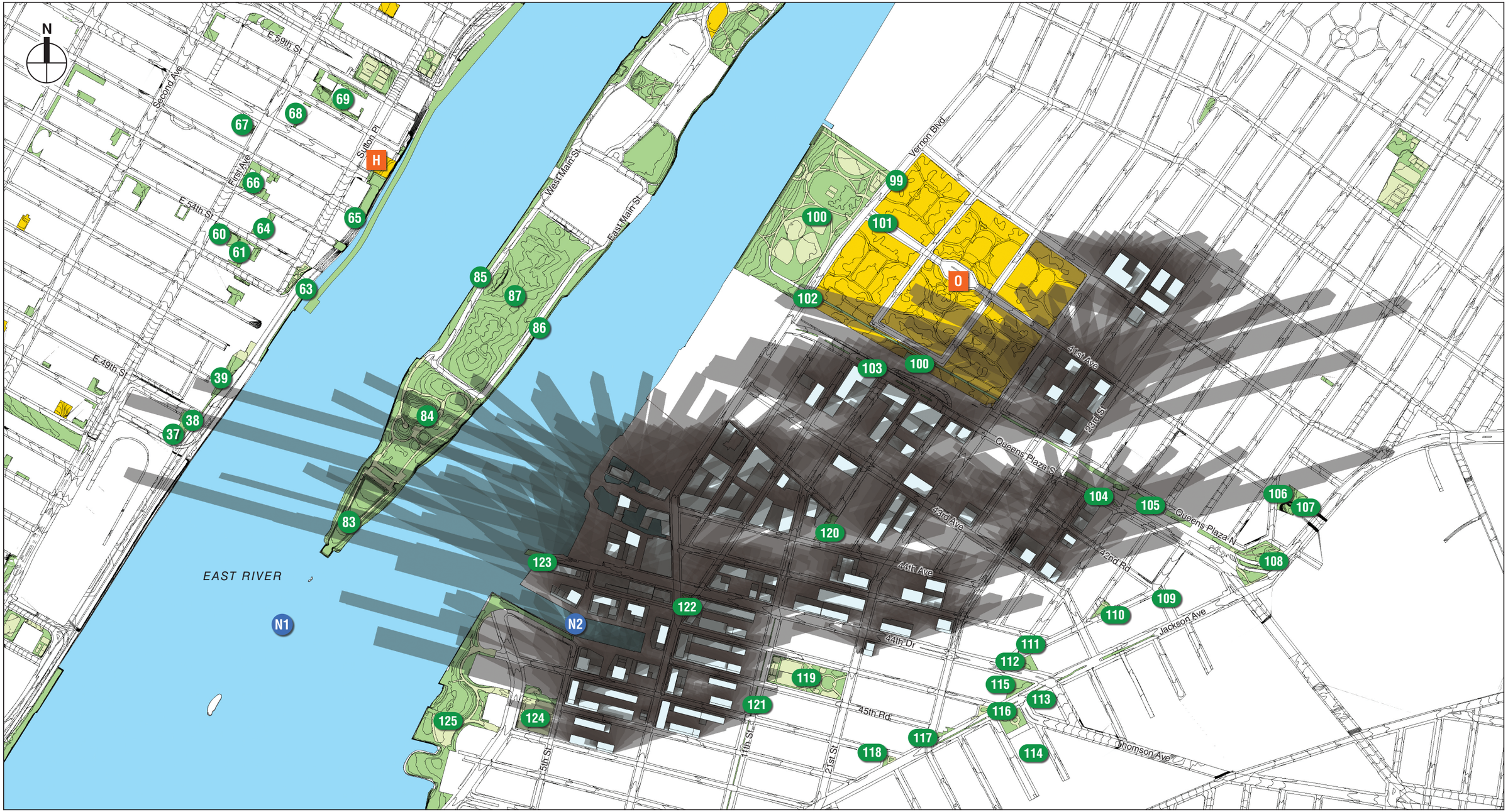

Development Sites

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

This figure illustrates the range of shadows that would occur from the Proposed Project on the analysis day representing the early spring and the fall. The shadows are shown occurring approximately every 60 minutes from the start of the analysis day (90 minutes after sunrise) to the end of the analysis day (90 minutes before sunset). The Tier 3 assessment does not account for future No Action shadows, and the shadows shown in this figure do not represent incremental shadows. The Tier 3 assessment serves to illustrate the daily path or "sweep" of the proposed building's shadows across the landscape, indicating which resources could potentially be affected on that analysis day, absent intervening buildings, by project-generated shadow. Daylight Saving Time was not used, per *CEQR Technical Manual* guidelines.

Tier 3 Assessment:
March 21 / September 21

Figure 6-3

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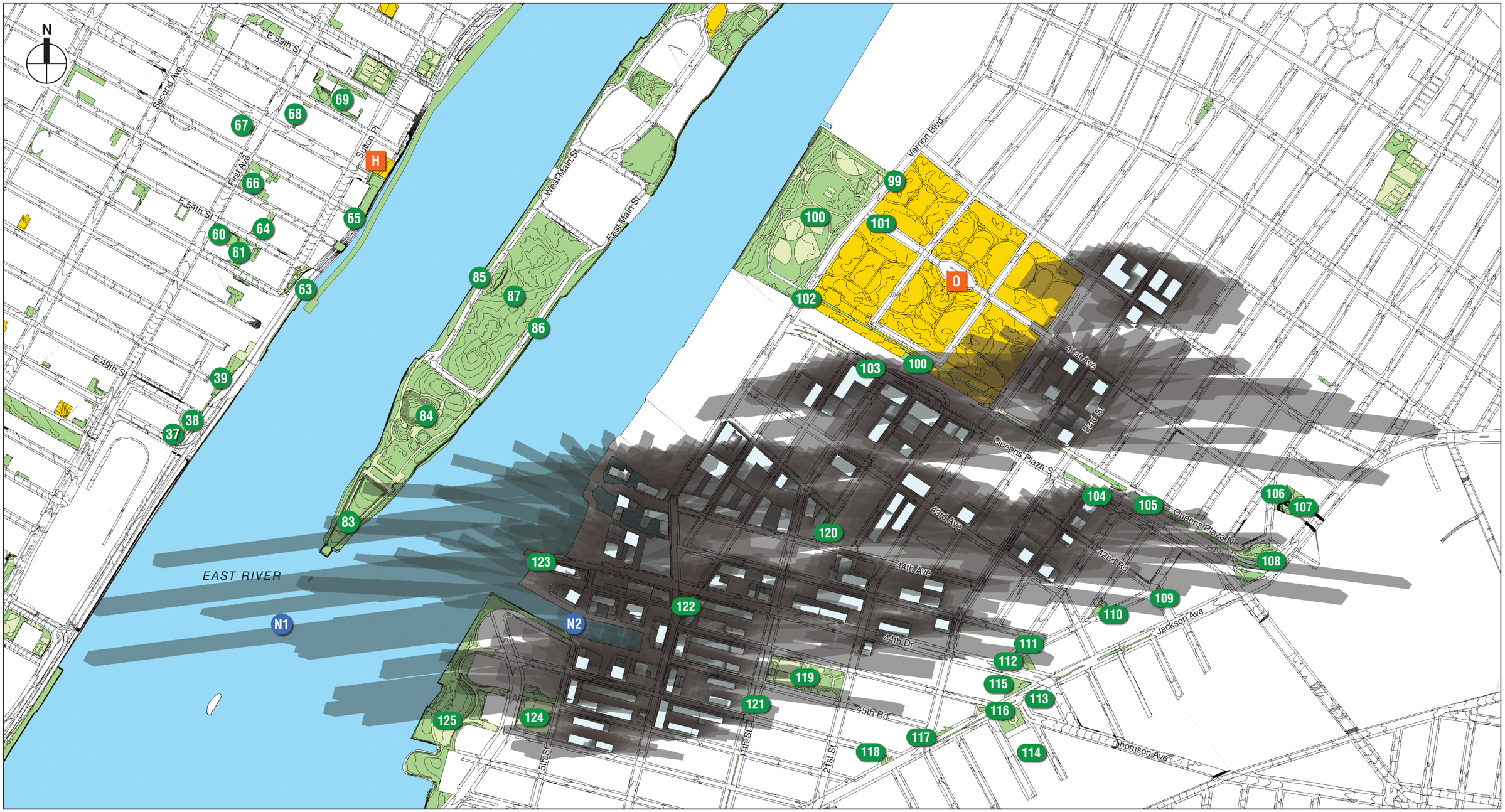


Development Sites

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

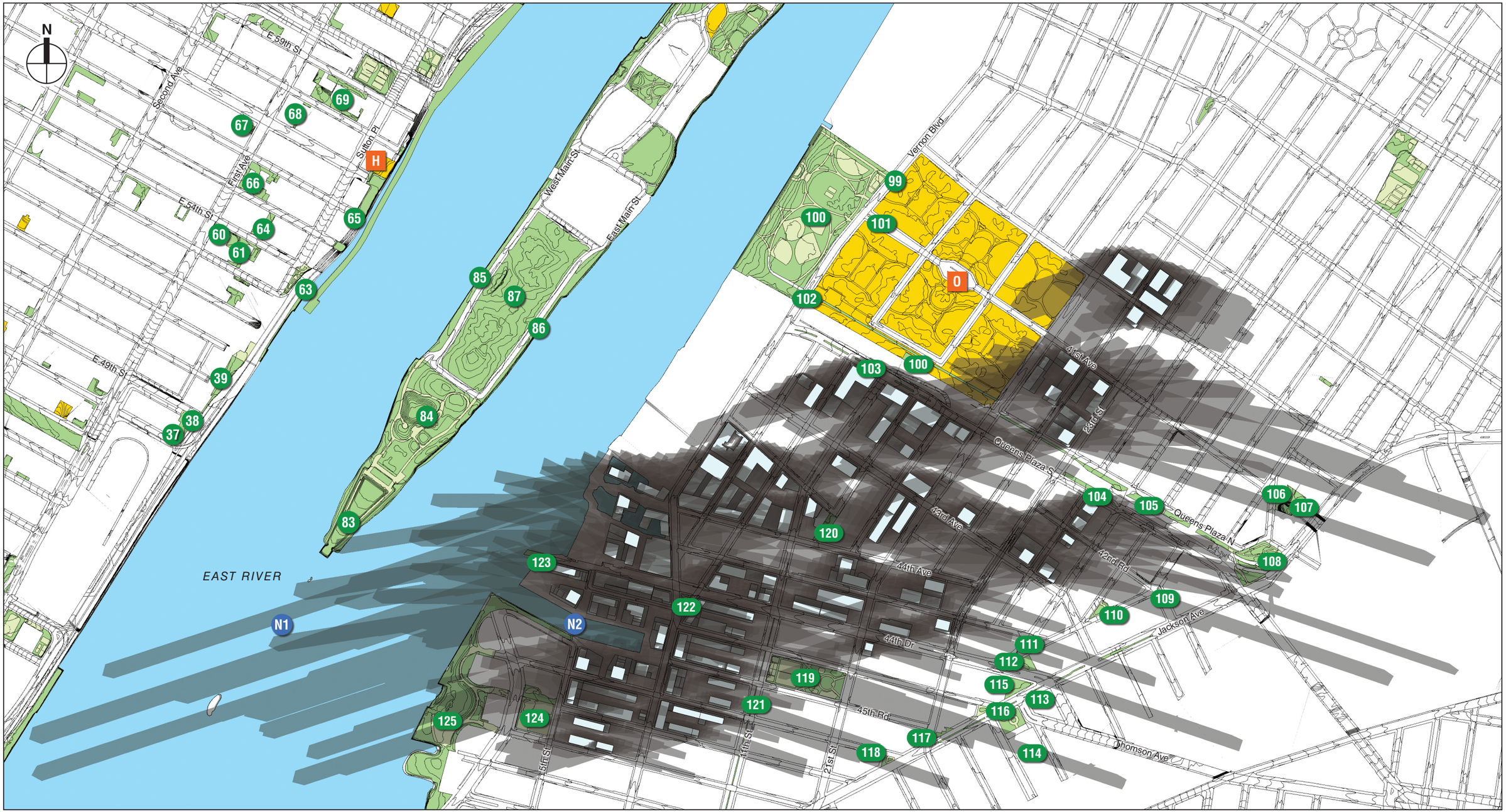
Natural Resources (refer to Table 6-1)

This figure illustrates the range of shadows that would occur from the Proposed Project on the analysis day representing the early spring and the fall. The shadows are shown occurring approximately every 60 minutes from the start of the analysis day (90 minutes after sunrise) to the end of the analysis day (90 minutes before sunset). The Tier 3 assessment does not account for future No Action shadows, and the shadows shown in this figure do not represent incremental shadows. The Tier 3 assessment serves to illustrate the daily path or "sweep" of the proposed building's shadows across the landscape, indicating which resources could potentially be affected on that analysis day, absent intervening buildings, by project-generated shadow. Daylight Saving Time was not used, per *CEQR Technical Manual* guidelines.

Tier 3 Assessment:
May 6 / August 6

Figure 6-4

2.21.25



Development Sites

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

This figure illustrates the range of shadows that would occur from the Proposed Project on the analysis day representing the early spring and the fall. The shadows are shown occurring approximately every 60 minutes from the start of the analysis day (90 minutes after sunrise) to the end of the analysis day (90 minutes before sunset). The Tier 3 assessment does not account for future No Action shadows, and the shadows shown in this figure do not represent incremental shadows. The Tier 3 assessment serves to illustrate the daily path or "sweep" of the proposed building's shadows across the landscape, indicating which resources could potentially be affected on that analysis day, absent intervening buildings, by project-generated shadow. Daylight Saving Time was not used, per *CEQR Technical Manual* guidelines.

LONG ISLAND CITY NEIGHBORHOOD PLAN

Tier 3 Assessment:
June 21
Figure 6-5

Following the analysis framework described in Chapter 1, "Project Description," the detailed analysis was performed for the analysis year of 2035. In the No Action condition, absent the Proposed Actions, it was assumed that the identified projected development sites would either remain unchanged from existing conditions or become occupied by uses that are as-of-right under existing zoning and reflect current trends[7]. In addition, future planned developments in the study area were added to the No Action baseline using best-available information from publicly available filings with the New York City Department of Buildings and other sources.

Shadows are in constant movement. The computer simulation software utilized for the analysis produces a minute-by-minute animation showing the movement of shadows over the course of each analysis period. The analysis determines the time when incremental shadow would enter each resource, and the time it would exit. Shadows analyses were performed for each of the representative days and analysis periods indicated in the Tier 3 assessment.

DETERMINATION OF IMPACT SIGNIFICANCE

The determination of significance of shadow impacts on a sunlight-sensitive resource is based on (1) the information resulting from the detailed shadow analysis describing the extent and duration of incremental shadows; and (2) an analysis of the resource's sensitivity to reduced sunlight. The goal of the assessment is to determine whether the effects of incremental shadows on a sunlight-sensitive resource are significant under CEQR.

A shadow impact occurs when the incremental shadow from a proposed project falls on a sunlight-sensitive resource or feature and reduces its direct sunlight exposure. Determining whether this impact is significant or not depends on the extent and duration of the incremental shadow and the specific context in which the impact occurs.

According to the *CEQR Technical Manual*, a significant shadow impact generally occurs when an incremental shadow of 10 minutes or longer falls on a sunlight-sensitive resource and results in one of the following:

- **Vegetation:**
  - A substantial reduction in sunlight available to a sunlight-sensitive feature of the resource to less than the minimum time necessary for its survival (when there was sufficient sunlight in the No Action condition). In the growing season, four to six hours a day of sunlight is a minimum requirement.
  - A reduction in direct sunlight exposure where the sensitive feature of the resource is already subject to substandard sunlight (i.e., less than the minimum time necessary for its survival).
- **Historic and Cultural Resources:**
  - A substantial reduction in sunlight available for the enjoyment or appreciation of the sunlight-sensitive features of a historic or cultural resource.

[7] For a more detailed and quantitative description of the developments assumed under the No Action condition, please see Chapter 1, "Project Description."

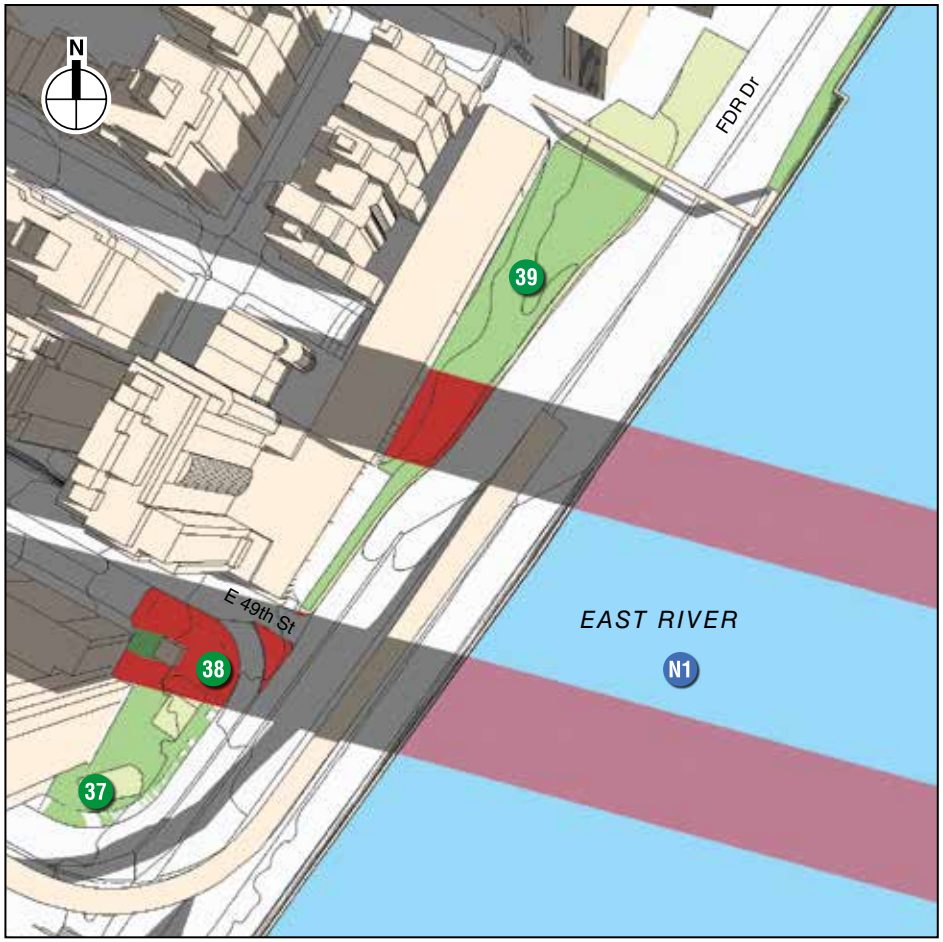
- **Open Space Utilization:**
  - A substantial reduction in the usability of open space as a result of increased shadows, accounting for anticipated new users and the open space's utilization rates throughout the affected time periods.
- **For Any Sunlight-Sensitive Feature of a Resource:**
  - Complete elimination of all direct sunlight on the sunlight-sensitive feature of the resource, when the complete elimination results in substantial effects on the survival, enjoyment, or, in the case of open space or natural resources, the use of the resource.

SUMMARY OF ANALYSIS RESULTS

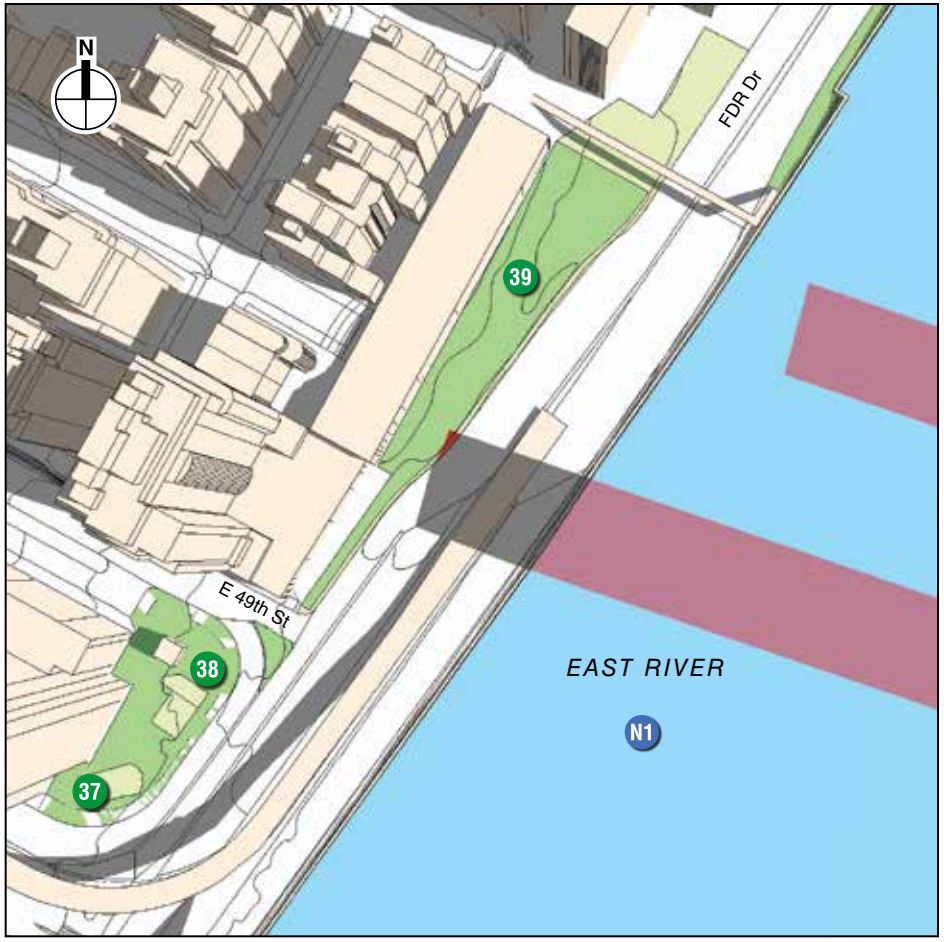
Table 6-2 summarizes the entry and exit times and total duration of incremental shadows on each affected sun-sensitive resource. **Figures 6-6 to 6-79** document the results of the analysis by providing graphic representations from the computer animation of times when incremental shadow would fall on a sun-sensitive resource. The figures illustrate the extent of additional, incremental shadow at that moment in time (highlighted in red), and also show existing shadow and remaining areas of sunlight.

Table 6-2
Incremental Shadow Durations

Map Reference	Name	Dec. 21	Mar. 21 / Sept. 21	May 6 / Aug. 6	Jun. 21
Publicly Accessible Open Spaces					
37	Macarthur Playground	—	7:36am to 7:43am Total 7 min	—	—
38	Greenstreet, E. 49th Street btw. Beekman Place and FDR Drive	—	7:36am to 7:43am Total 7 min	—	—
39	Peter Detmold Park	—	7:36am to 7:55am Total 19 min	—	—
63	East Midtown Greenway	8:51am to 9:58am Total 1 hr 7 min	—	—	—
65	Sutton Place Park	8:51am to 9:52am Total 1 hr 1 min	—	—	—
69	Sovereign POPS	9:30am to 9:34am Total 4 min	—	—	—
83	Franklin D. Roosevelt Four Freedoms Park	8:51am to 8:56am Total 5 min	7:36am to 9:17am Total 1 hr 41 min	6:27am to 8:04am Total 1 hr 37 min	6:39am to 7:12am Total 33 min
84	Southpoint Park	8:51am to 10:20am Total 1 hr 29 min	7:36am to 9:45am Total 2 hr 9 min	7:35am to 8:10am Total 35 min	—
85	West Esplanade	8:51am to 10:55am Total 1 hr 46 min	—	—	—
86	East Esplanade	8:51am to 12:01pm Total 3 hr 10 min	9:04am to 10:01am Total 57 min	—	—
87	Cornell Tech POPS	8:51am to 11:44am Total 2 hr 53 min	9:14am to 9:47am Total 33 min	—	—
99	Greenstreet, Vernon Boulevard btw. 41st Avenue and 40th Avenue	2:20pm to 2:30pm 2:32pm to 2:35pm 2:39 to 2:49pm Total 23 min	—	—	—



7:36 AM EST (8:36 AM EDT)



7:55 AM EST (8:55 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Macarthur Playground (#37), Greenstreet,
E. 49th Street btw. Beekman Place and FDR Drive (#38),
and Peter Detmold Park (#39)

Detailed Analysis
March 21 / September 21

2.21.25



8:51 AM



9:10 AM

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

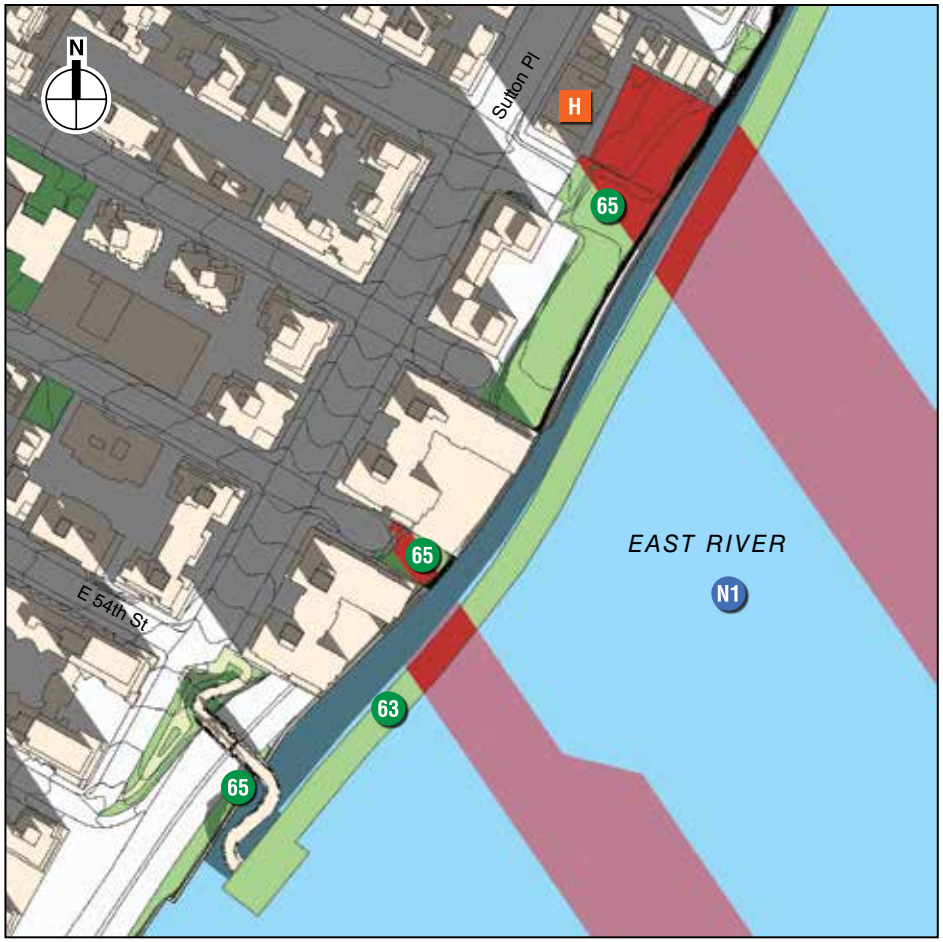
NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.

East Midtown Greenway (#63), Sutton Place Park (#65), and Sutton Place Historic District garden (H)

Detailed Analysis
December 21

Figure 6-7

2.21.25



9:30 AM



9:50 AM

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.

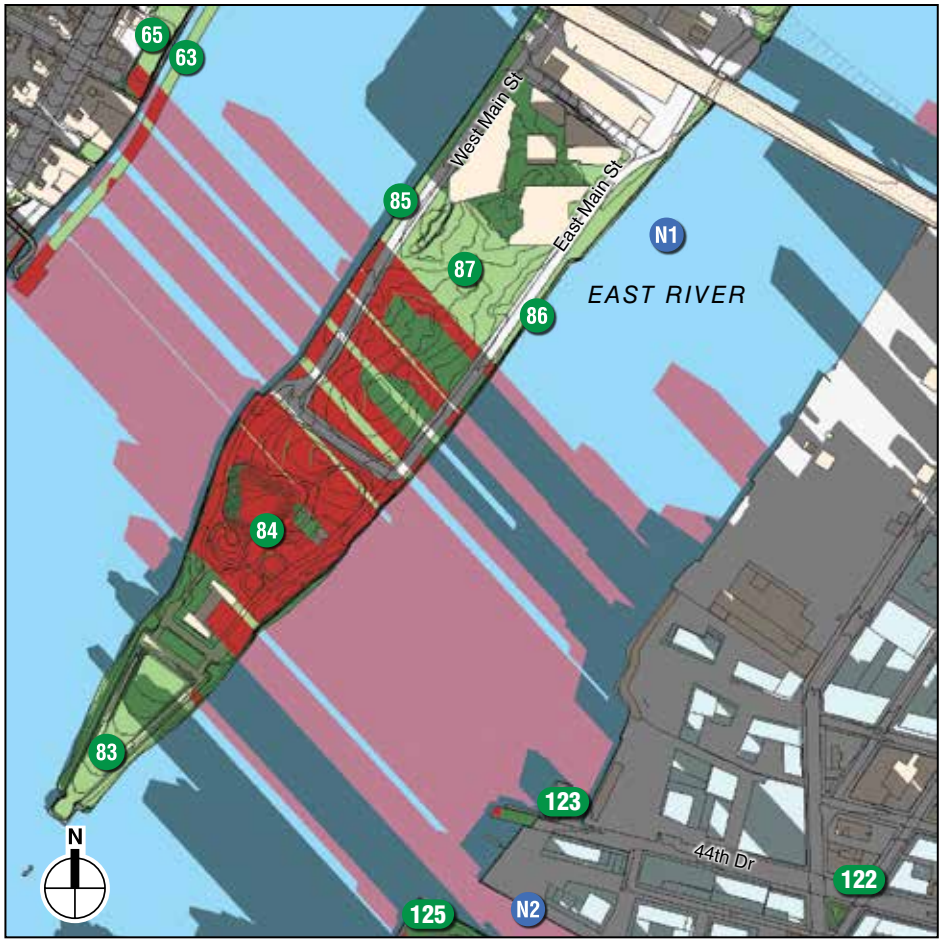
East Midtown Greenway (#63), Sutton Place Park (#65), and Sutton Place Historic District garden (H)

Detailed Analysis
December 21

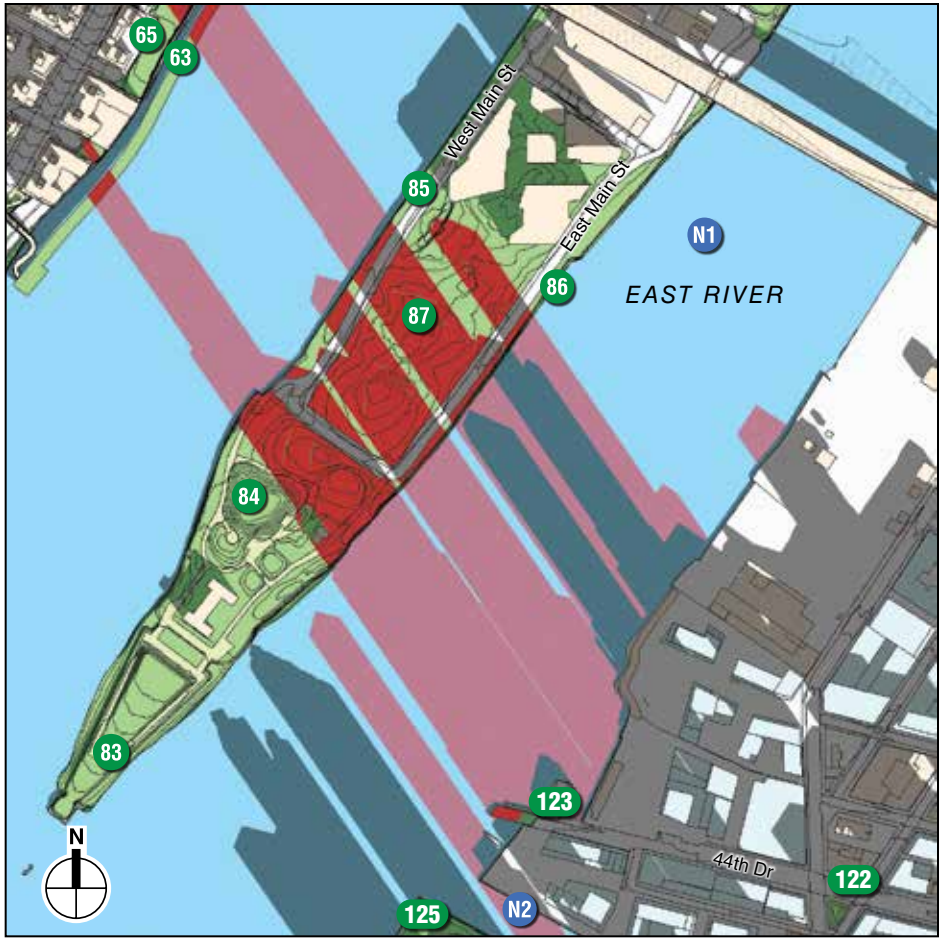
LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-8

2.21.25



8:51 AM



9:30 AM

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

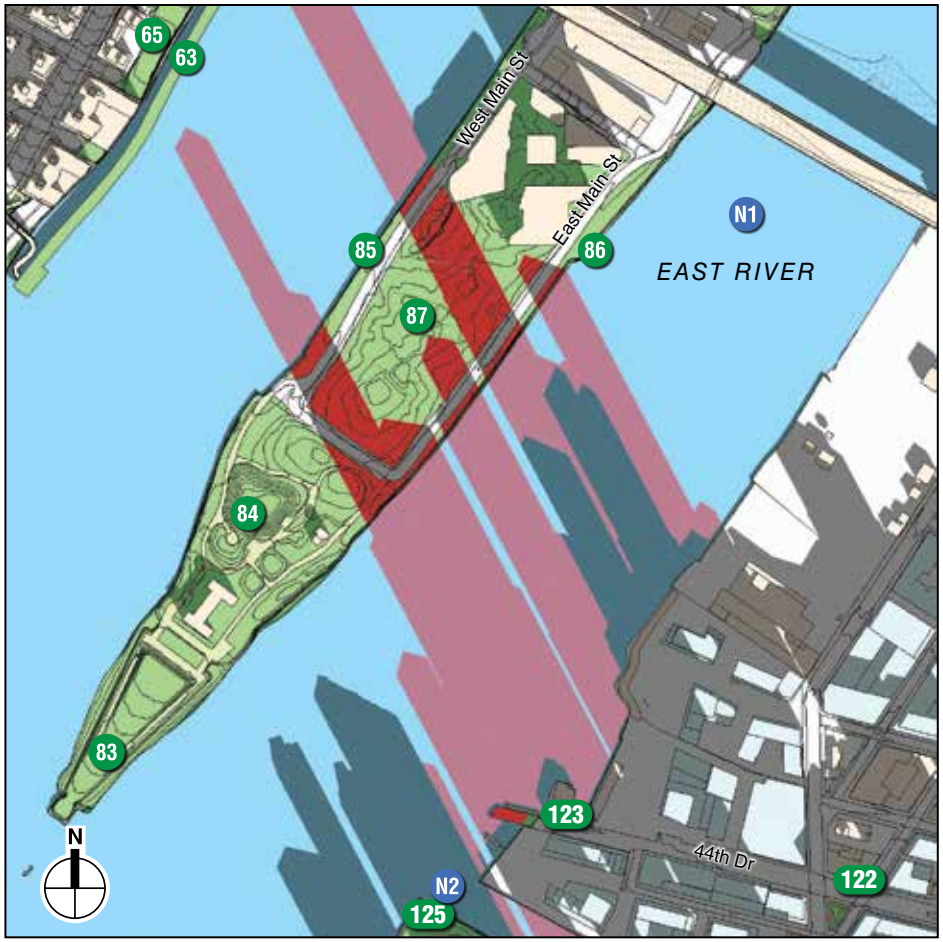
NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.

Roosevelt Island: Franklin D. Roosevelt Four Freedoms Park (#83), Southpoint Park (#84), West and East Esplanades (#85 and #86), and Cornell Tech POPS (#87)

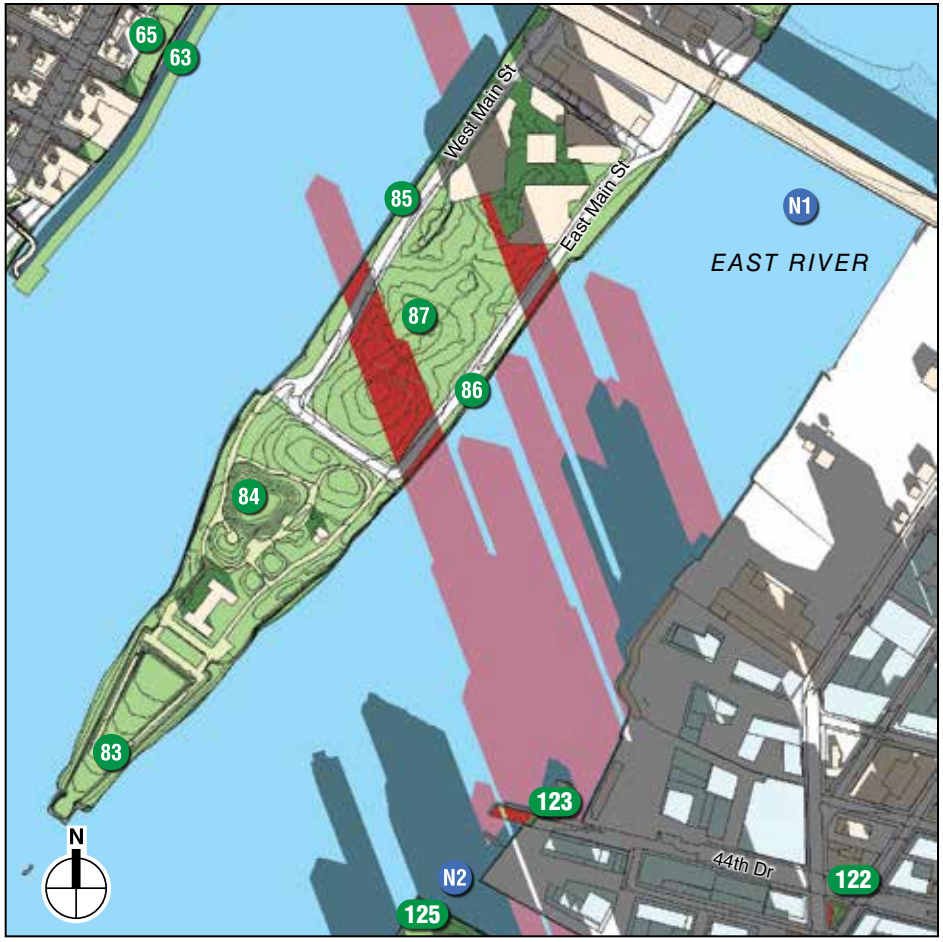
Detailed Analysis
December 21

Figure 6-9

2.21.25



10:00 AM



10:30 AM

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.

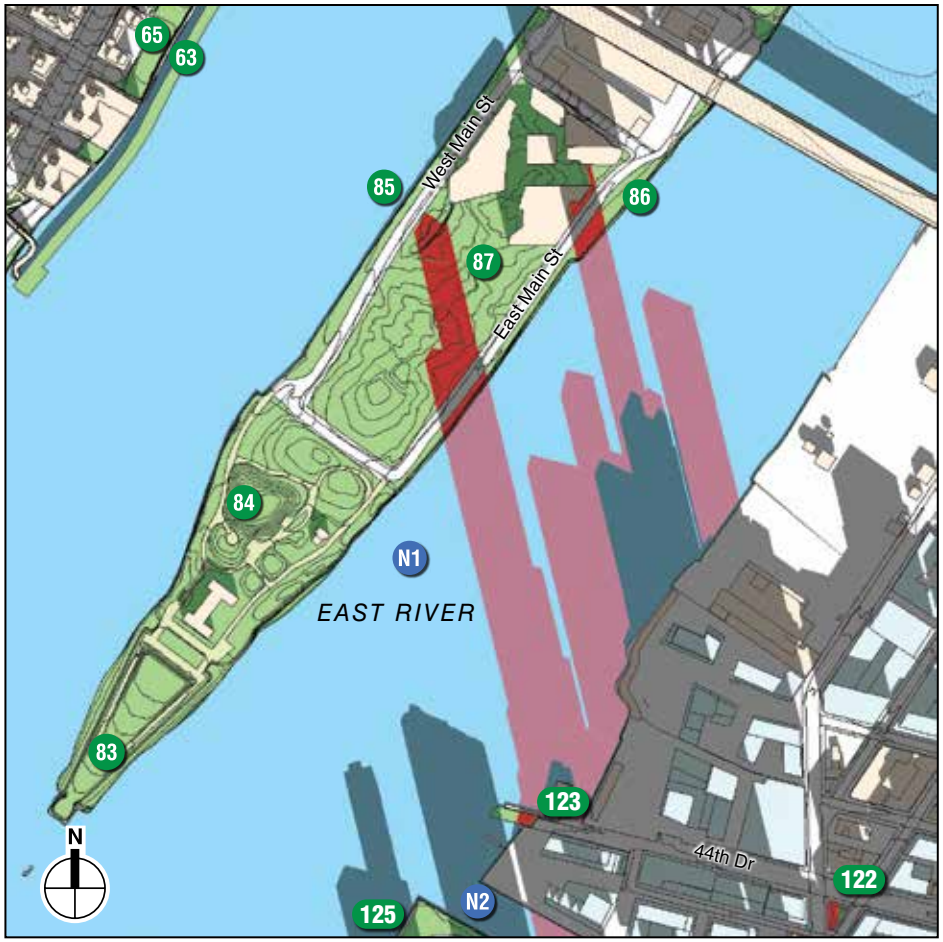
Roosevelt Island: Franklin D. Roosevelt Four Freedoms Park (#83), Southpoint Park (#84), West and East Esplanades (#85 and #86), and Cornell Tech POPS (#87)

Detailed Analysis
December 21

LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-10

2.21.25



11:00 AM



11:30 AM

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.

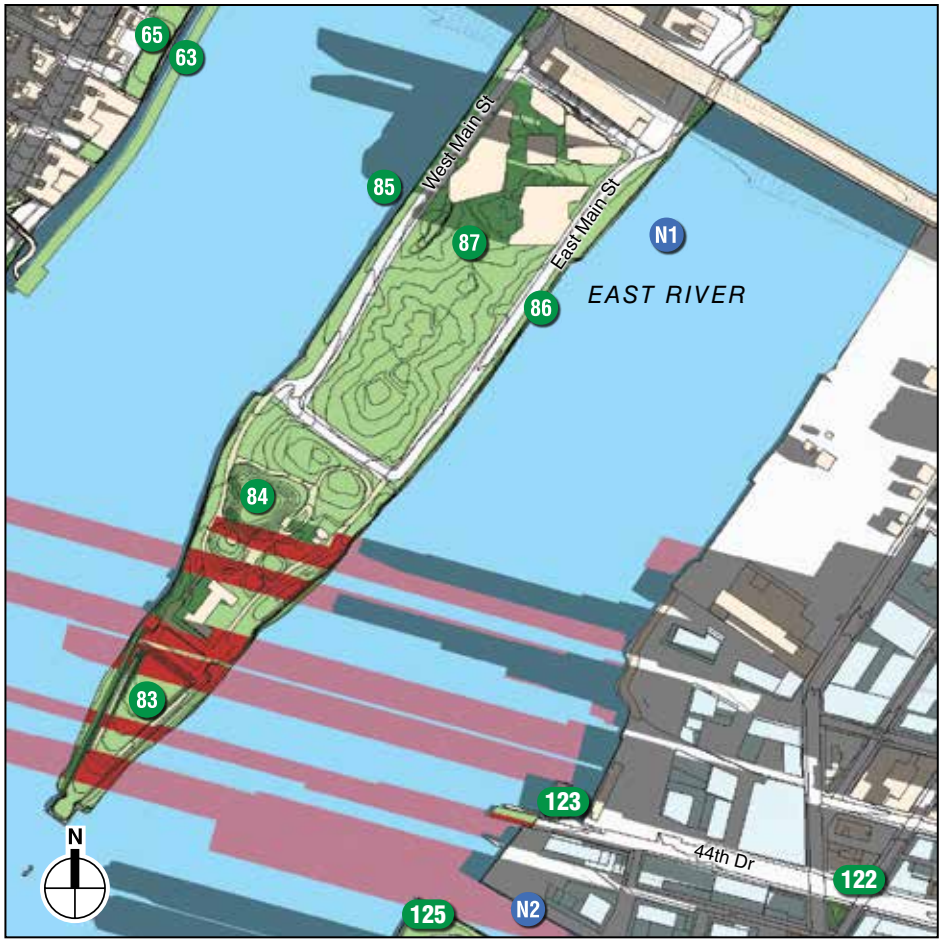
Roosevelt Island: Franklin D. Roosevelt Four Freedoms Park (#83), Southpoint Park (#84), West and East Esplanades (#85 and #86), and Cornell Tech POPS (#87)

Detailed Analysis
December 21

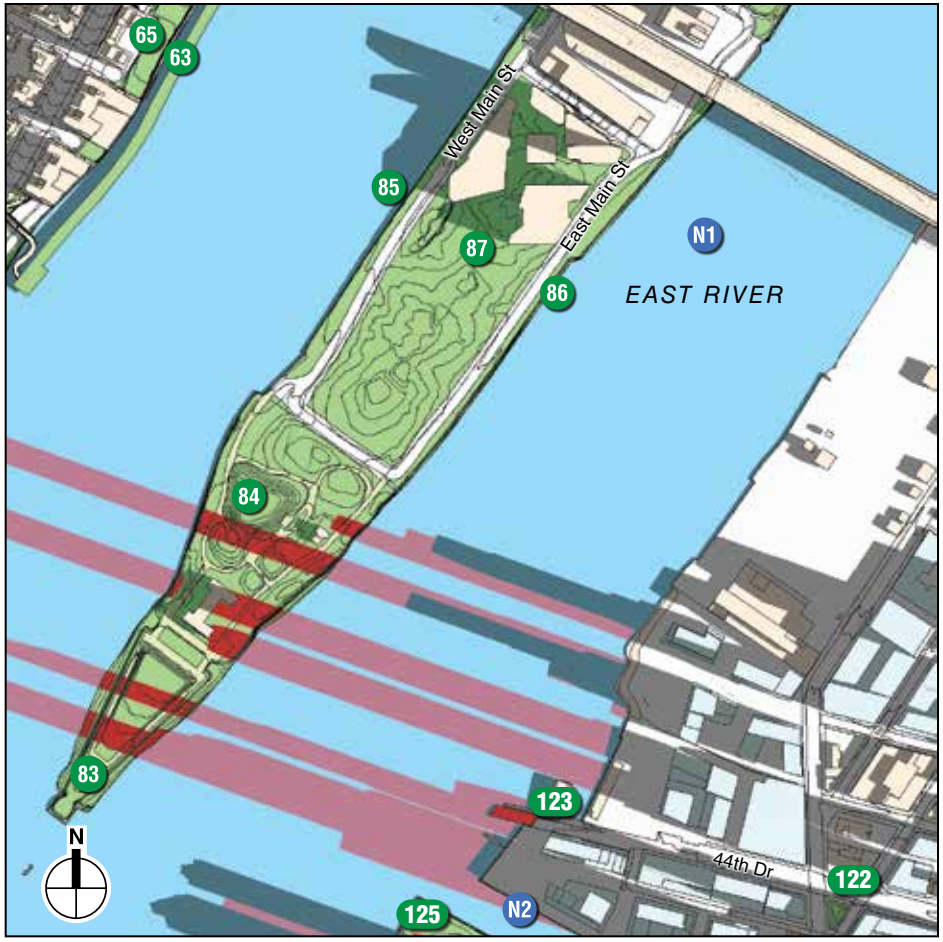
LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-11

2.21.25



7:36 AM EST (8:36 AM EDT)



8:00 AM EST (9:00 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

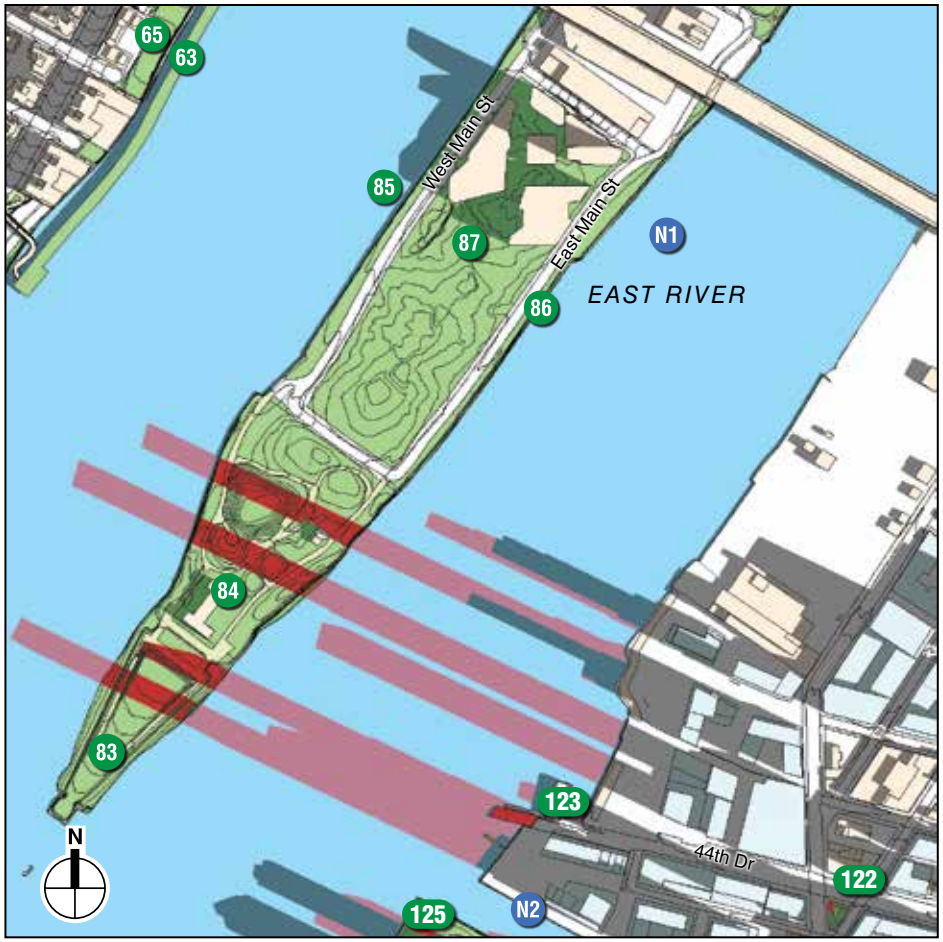
Roosevelt Island: Franklin D. Roosevelt Four Freedoms Park (#83), Southpoint Park (#84), West and East Esplanades (#85 and #86), and Cornell Tech POPS (#87)

Detailed Analysis
March 21 / September 21

LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-12

2.21.25



8:30 AM EST (9:30 AM EDT)



9:00 AM EST (10:00 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Roosevelt Island: Franklin D. Roosevelt Four Freedoms Park (#83), Southpoint Park (#84), West and East Esplanades (#85 and #86), and Cornell Tech POPS (#87)

Detailed Analysis
March 21 / September 21

LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-13

2.21.25



9:30 AM EST (10:30 AM EDT)



10:00 AM EST (11:00 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Roosevelt Island: Franklin D. Roosevelt Four Freedoms Park (#83), Southpoint Park (#84), West and East Esplanades (#85 and #86), and Cornell Tech POPS (#87)

Detailed Analysis
March 21 / September 21

Figure 6-14



6:27 AM EST (7:27 AM EDT)



7:00 AM EST (8:00 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Roosevelt Island: Franklin D. Roosevelt Four Freedoms Park (#83), Southpoint Park (#84), West and East Esplanades (#85 and #86), and Cornell Tech POPS (#87)

Detailed Analysis
May 6 / August 6

Figure 6-15



7:30 AM EST (8:30 AM EDT)



8:00 AM EST (9:00 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

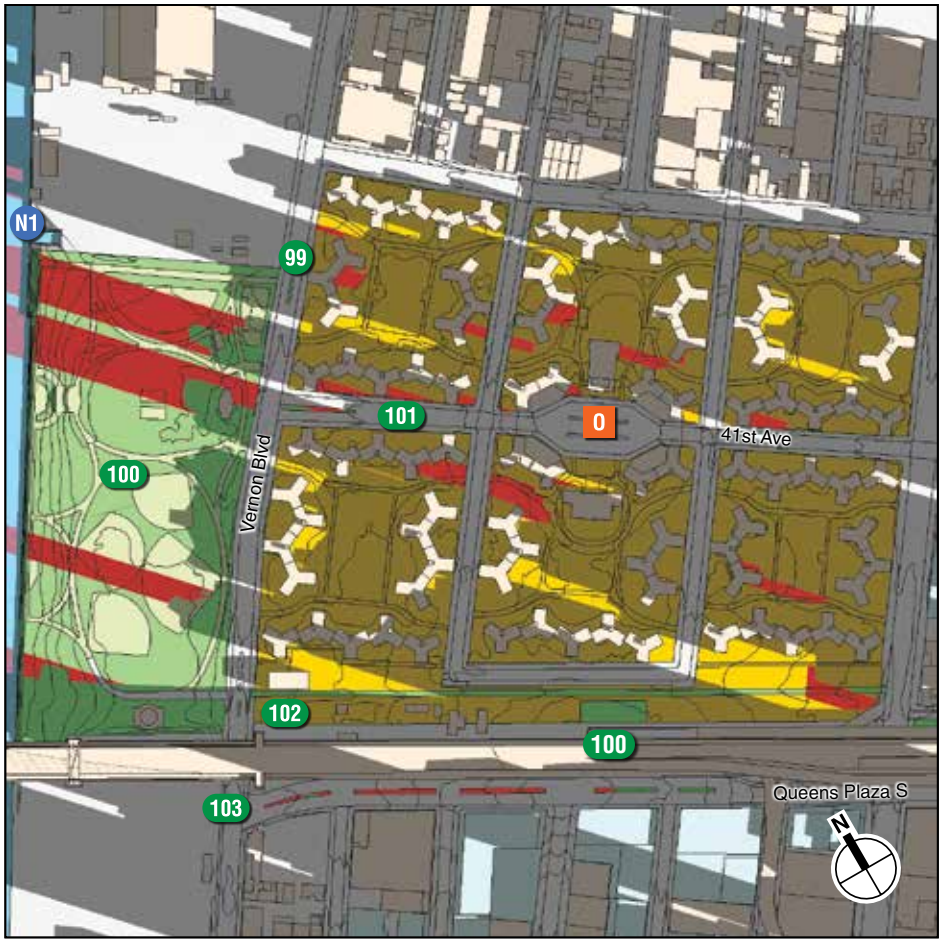
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Roosevelt Island: Franklin D. Roosevelt Four Freedoms Park (#83), Southpoint Park (#84), West and East Esplanades (#85 and #86), and Cornell Tech POPS (#87)

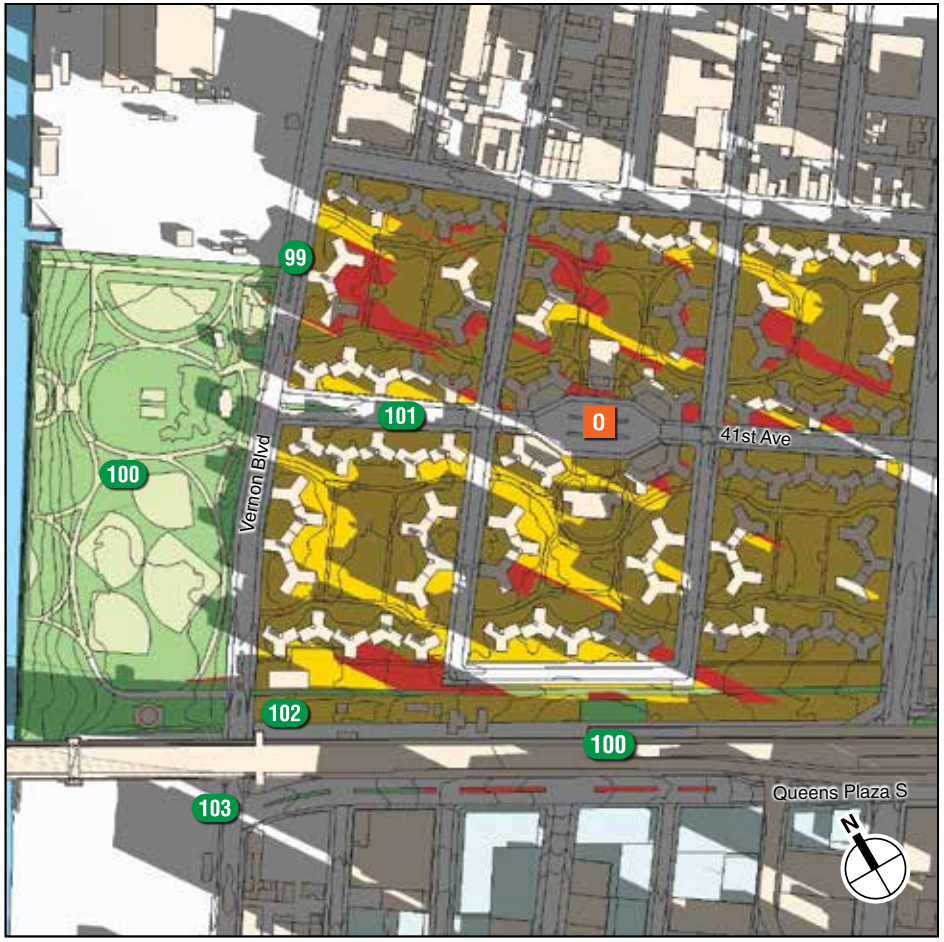
Detailed Analysis
May 6 / August 6

LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-16



8:51 AM



9:30 AM

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

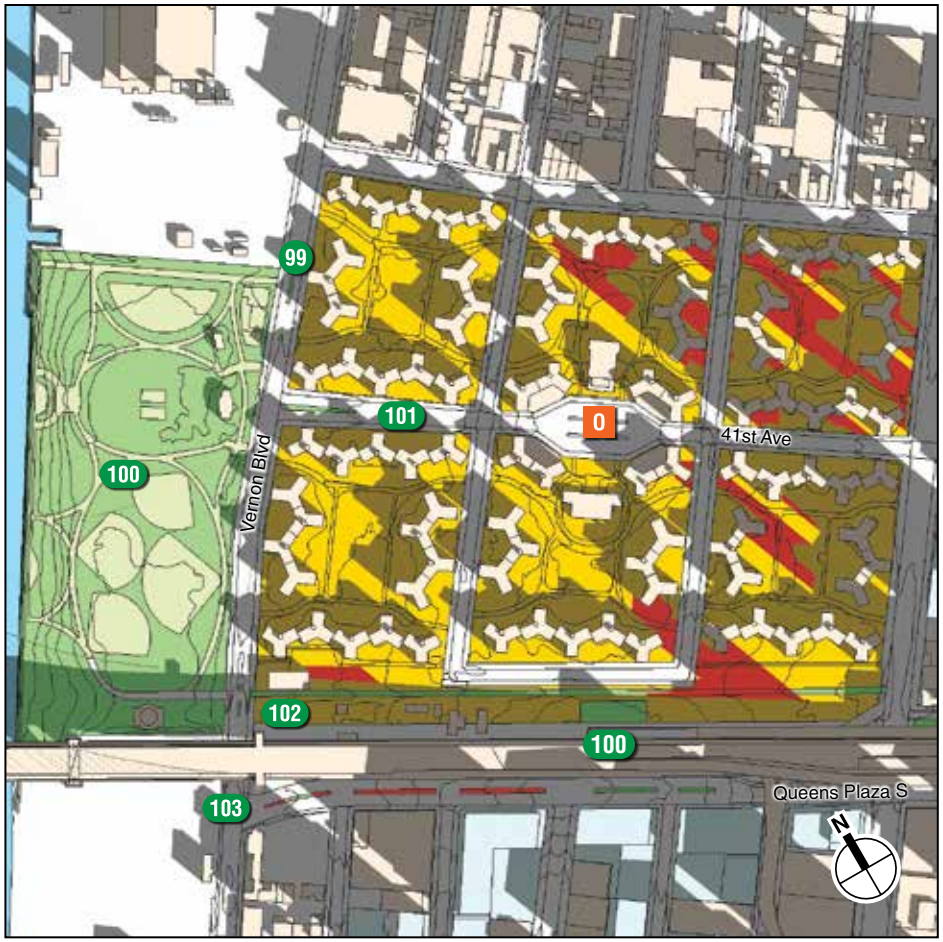
Natural Resources (refer to Table 6-1)

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.

Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

Detailed Analysis
December 21

Figure 6-17



10:30 AM



11:30 AM

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.

Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

Detailed Analysis
December 21

Figure 6-18



12:30 PM



1:30 PM

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

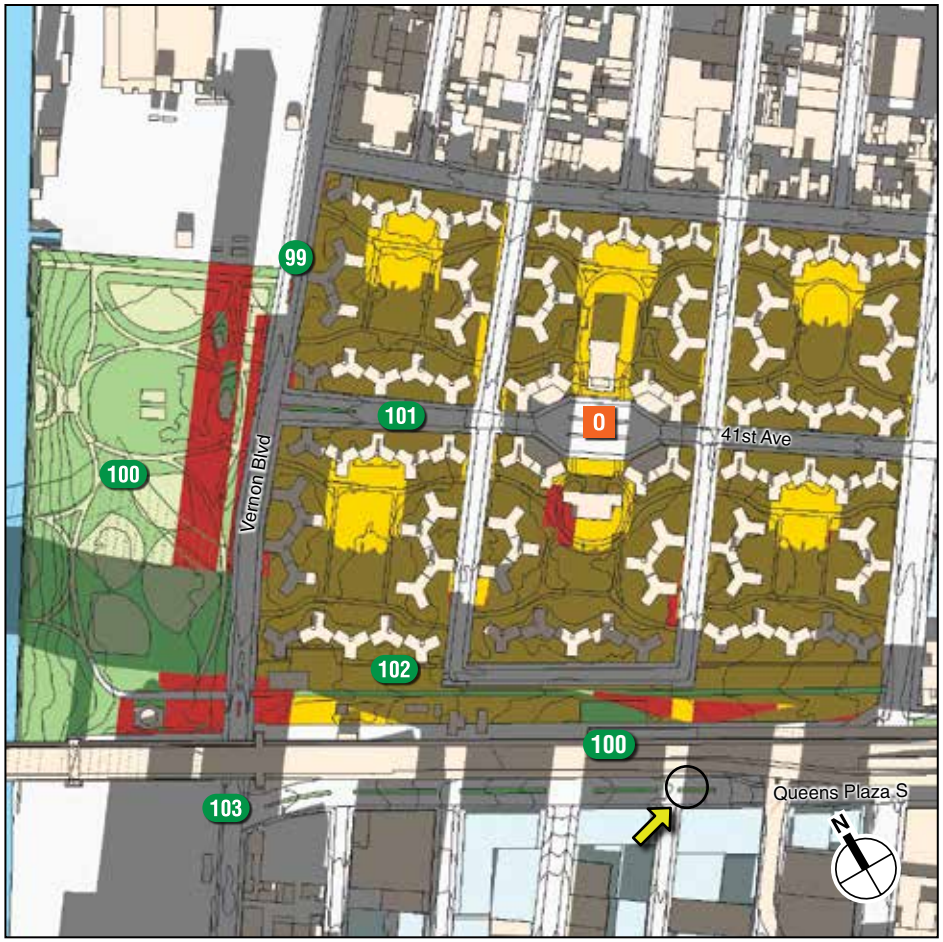
Natural Resources (refer to Table 6-1)

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.

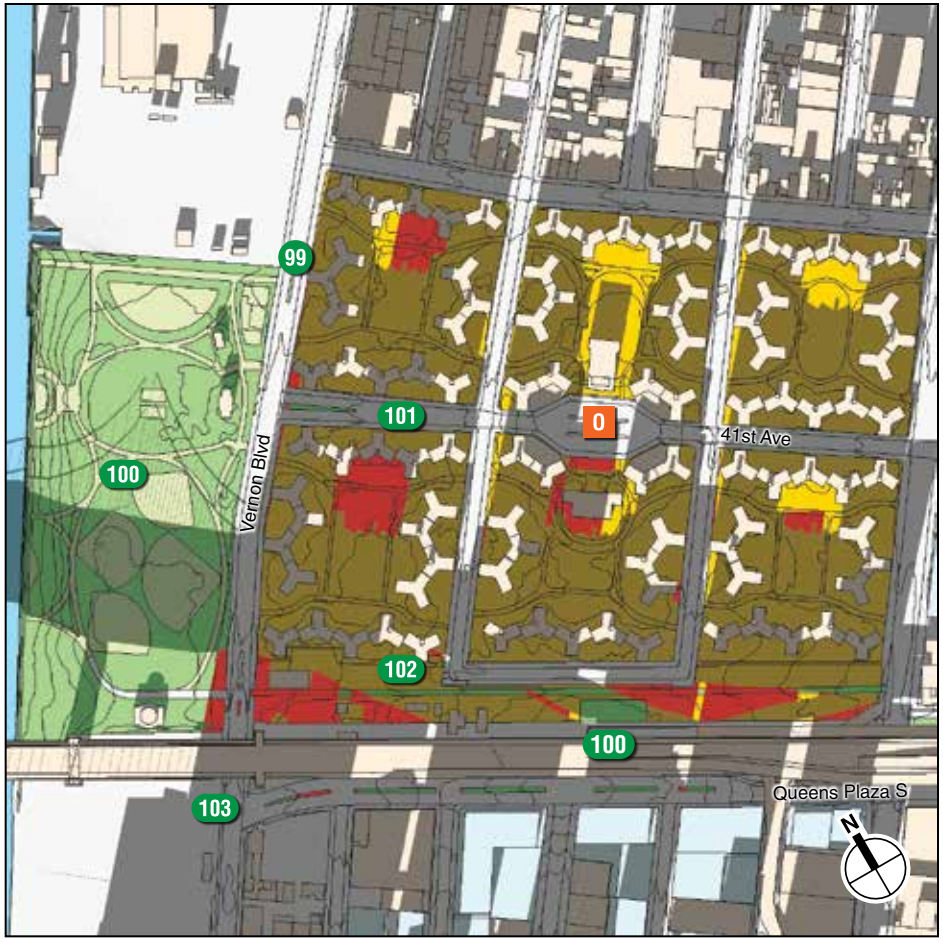
Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

Detailed Analysis
December 21

2.21.25



2:30 PM



2:53 PM

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.

Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

Detailed Analysis
December 21



7:36 AM EST (8:36 AM EDT)



8:30 AM EST (9:30 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

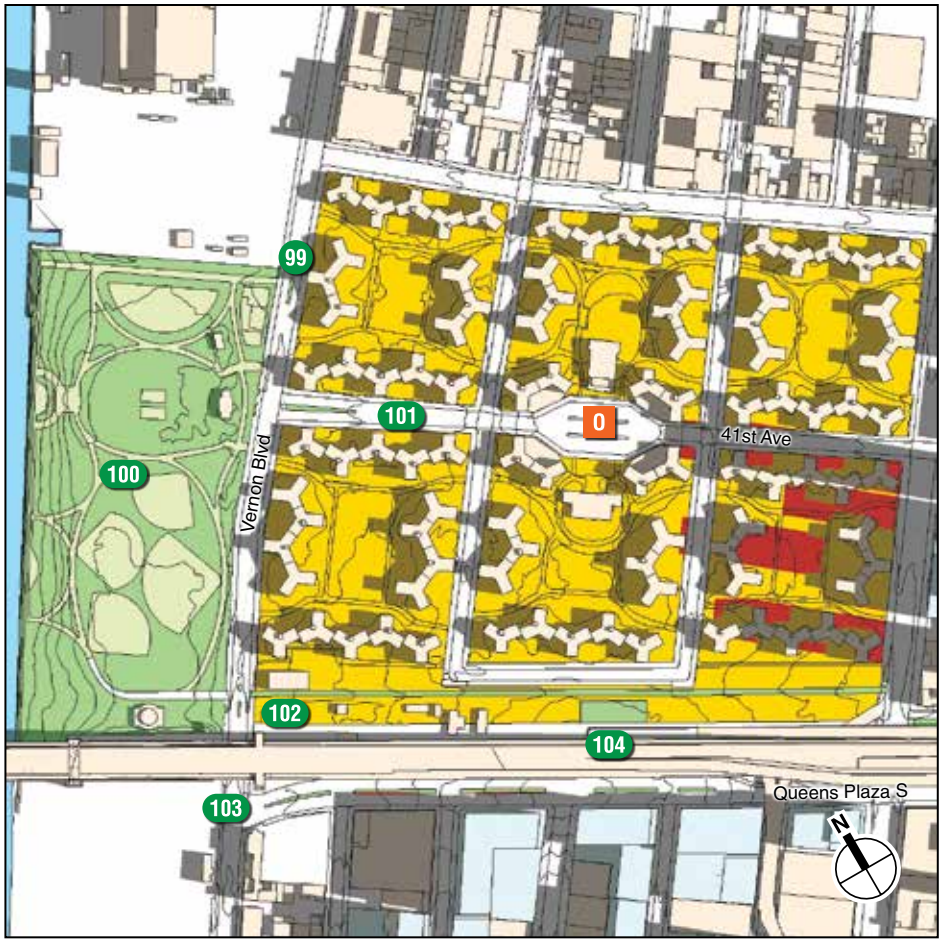
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

Detailed Analysis
March 21 / September 21

LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-21



9:30 AM EST (10:30 AM EDT)



10:30 AM EST (11:30 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

Detailed Analysis
March 21 / September 21

Figure 6-22



11:30 AM EST (12:30 PM EDT)



12:30 PM EST (1:30 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

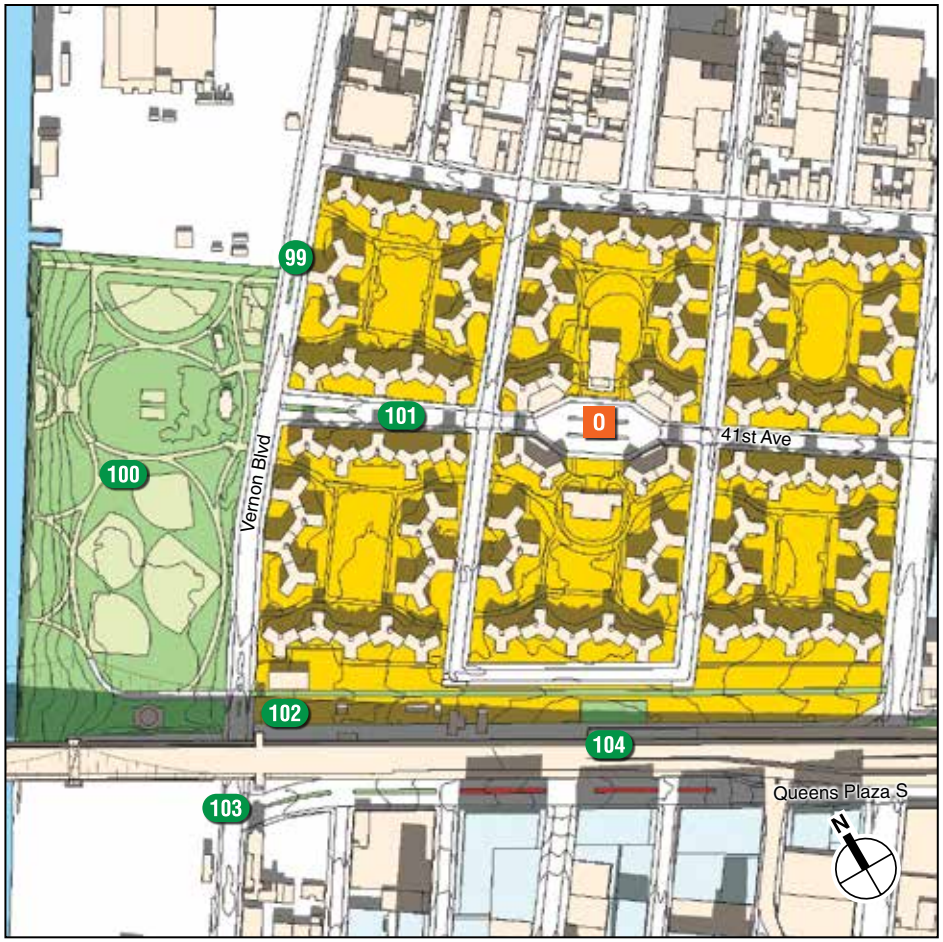
Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

Detailed Analysis
March 21 / September 21

Figure 6-23



1:30 PM EST (2:30 PM EDT)



2:30 PM EST (3:30 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

Detailed Analysis
March 21 / September 21

Figure 6-24



3:30 PM EST (4:30 PM EDT)



4:29 PM EST (5:29 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

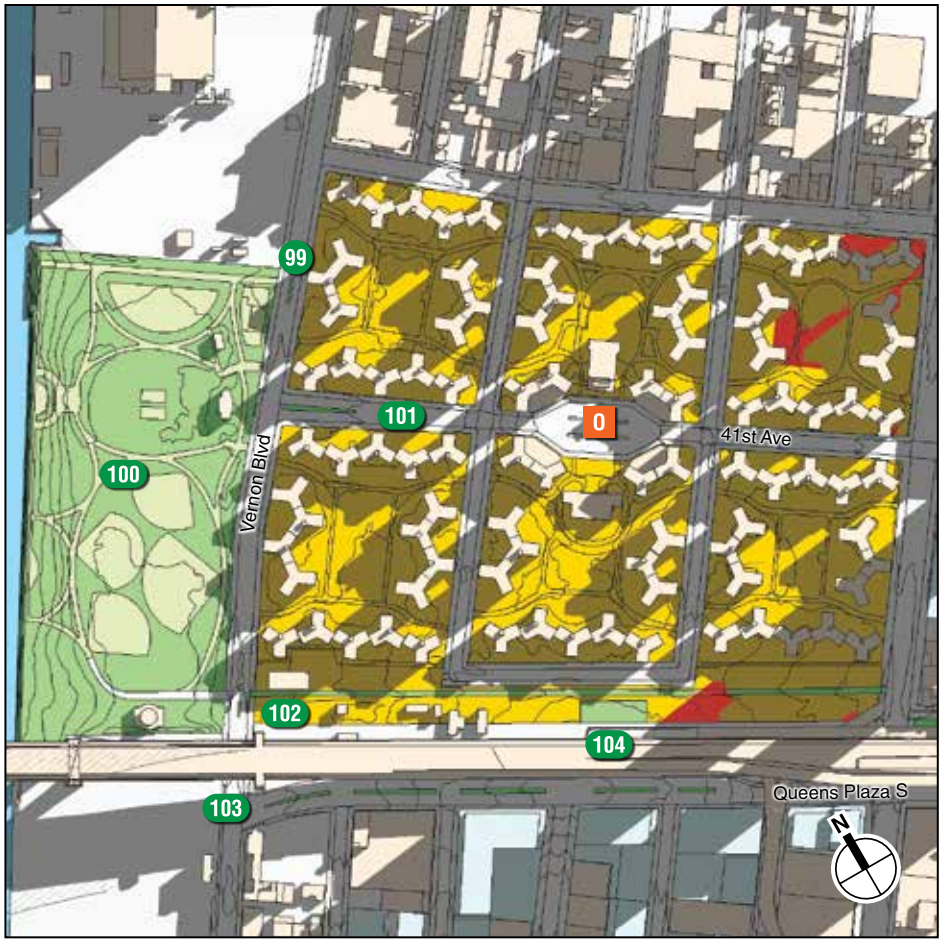
Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

Detailed Analysis
March 21 / September 21

Figure 6-25



6:27 AM EST (7:27 AM EDT)



7:30 AM EST (8:30 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

Detailed Analysis
May 6 / August 6

LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-26



8:30 AM EST (9:30 AM EDT)



9:30 AM EST (10:30 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

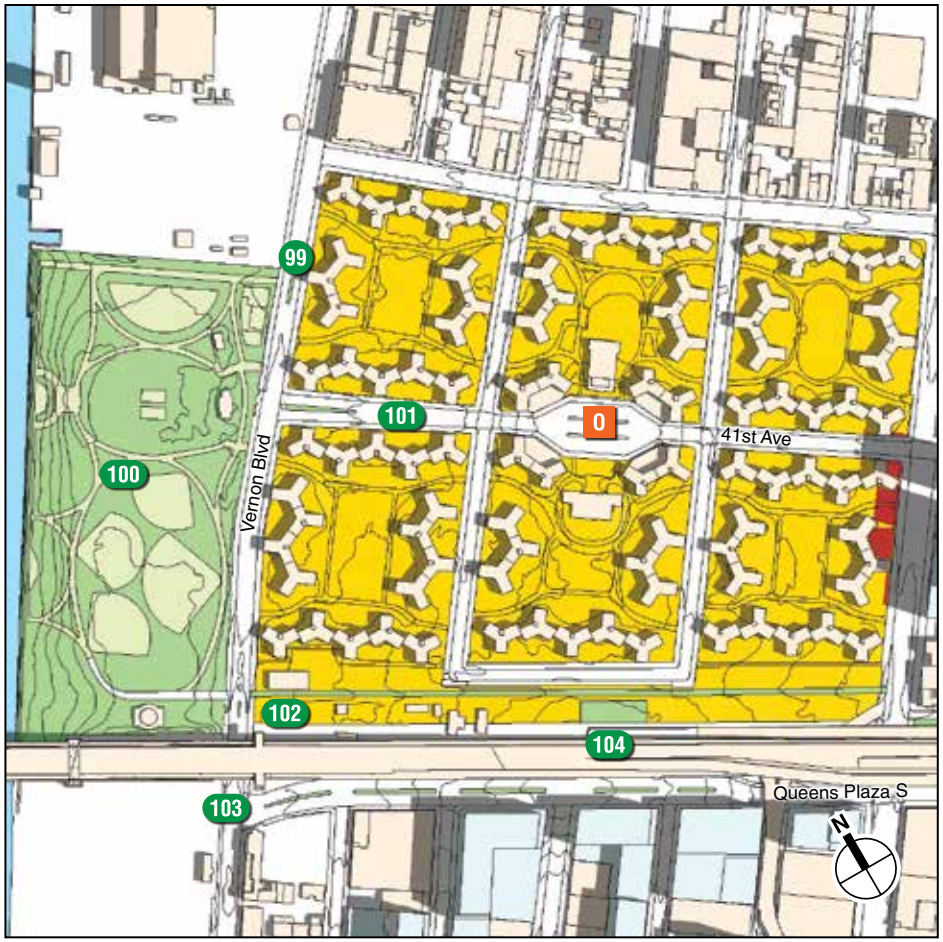
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

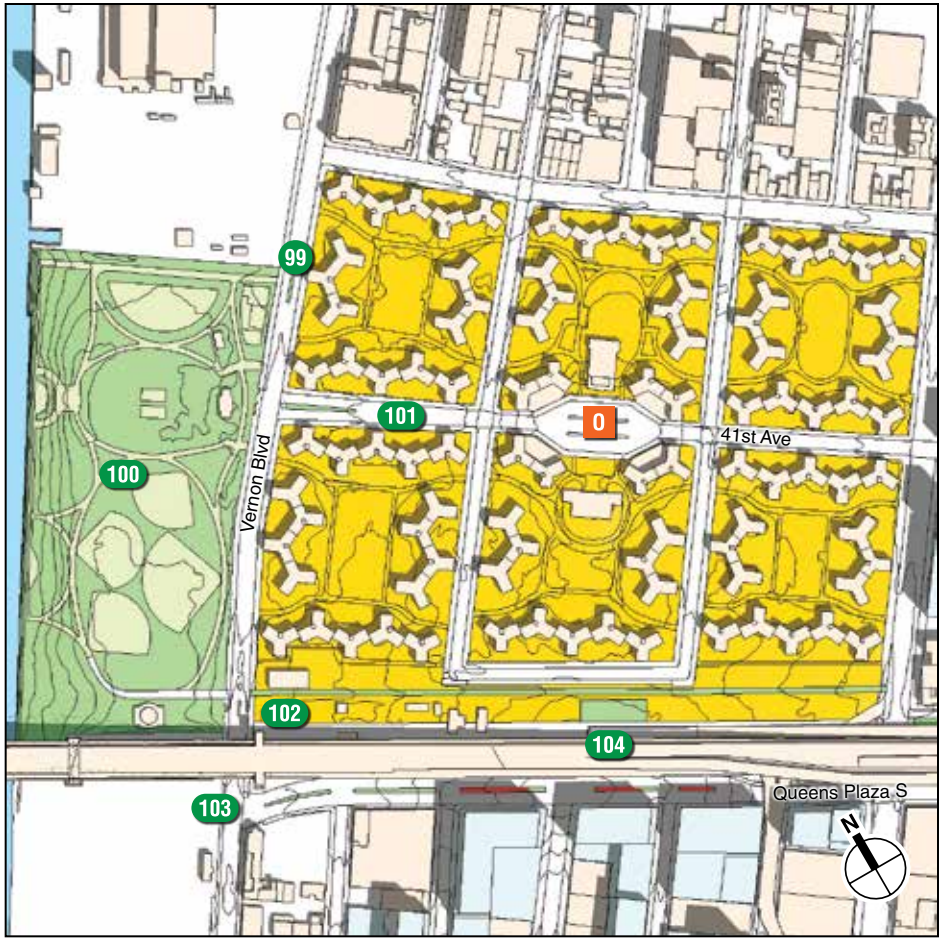
Detailed Analysis
May 6 / August 6

LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-27



10:30 AM EST (11:30 AM EDT)



11:30 AM EST (12:30 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

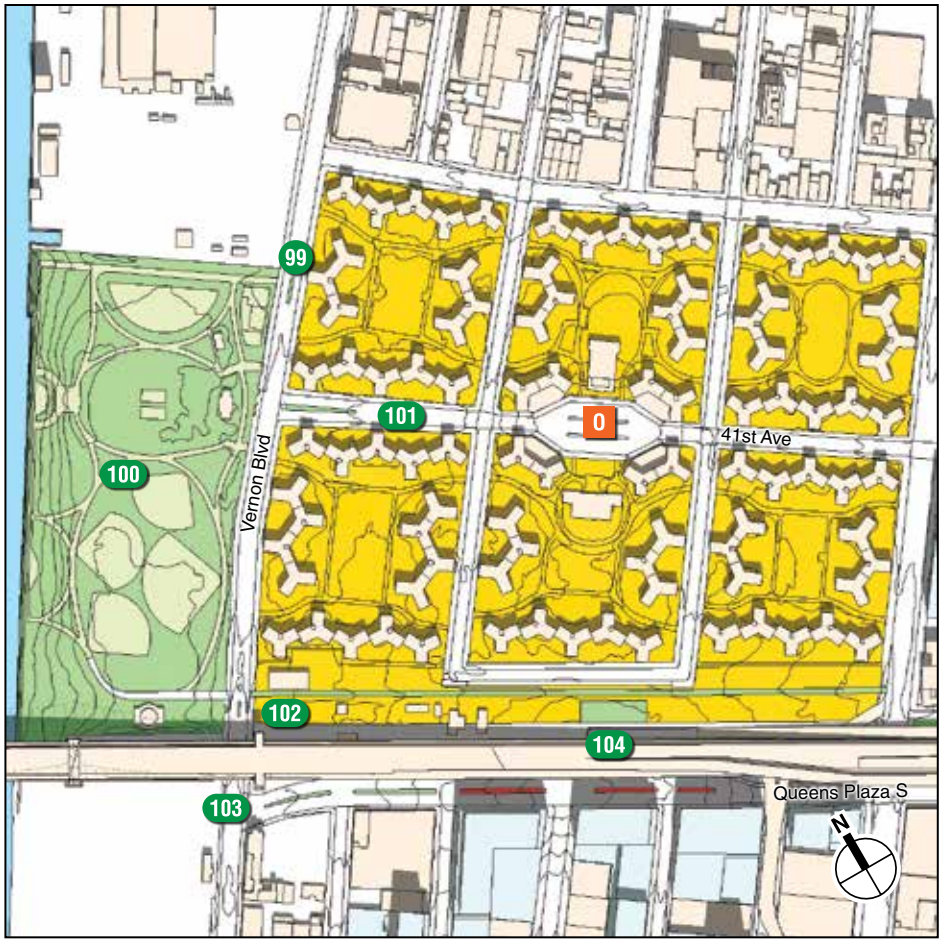
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

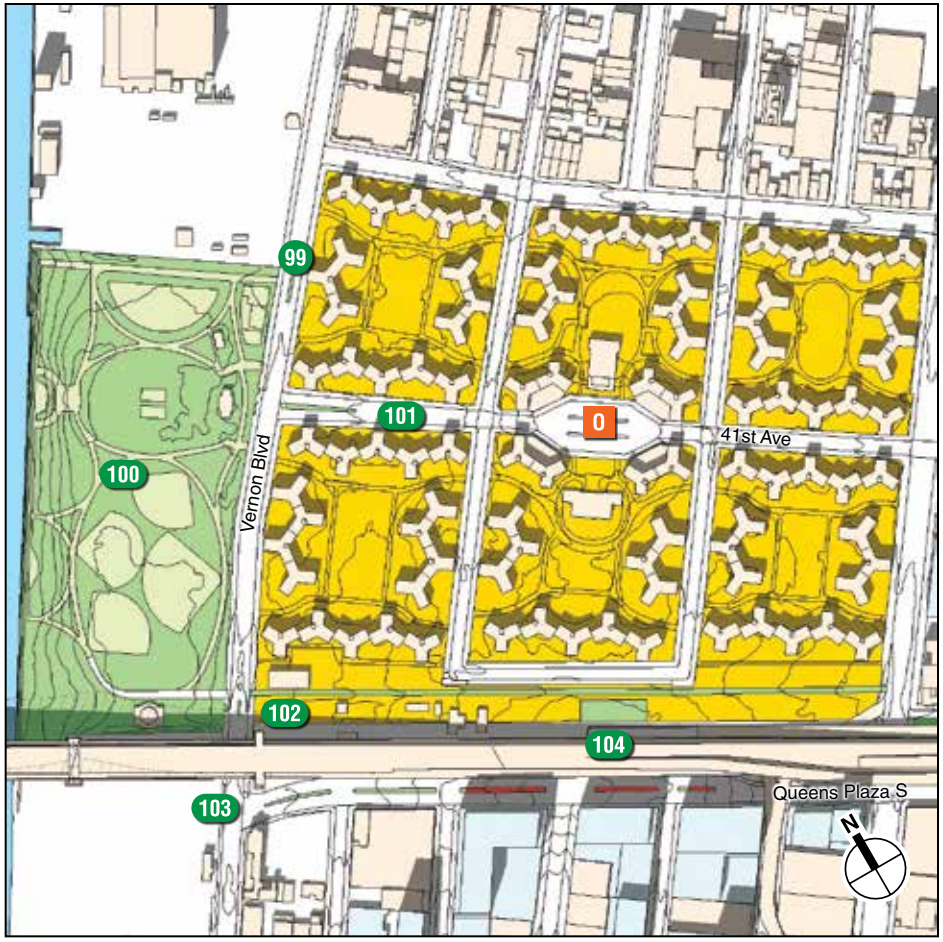
Detailed Analysis
May 6 / August 6

LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-28



12:30 PM EST (1:30 PM EDT)



1:30 PM EST (2:30 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

Detailed Analysis
May 6 / August 6

LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-29



2:30 PM EST (3:30 PM EDT)



3:30 PM EST (4:30 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

Detailed Analysis
May 6 / August 6

Figure 6-30



4:30 PM EST (5:30 PM EDT)



5:18 PM EST (6:18 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

Detailed Analysis
May 6 / August 6

LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-31



6:00 AM EST (7:00 AM EDT)



7:00 AM EST (8:00 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

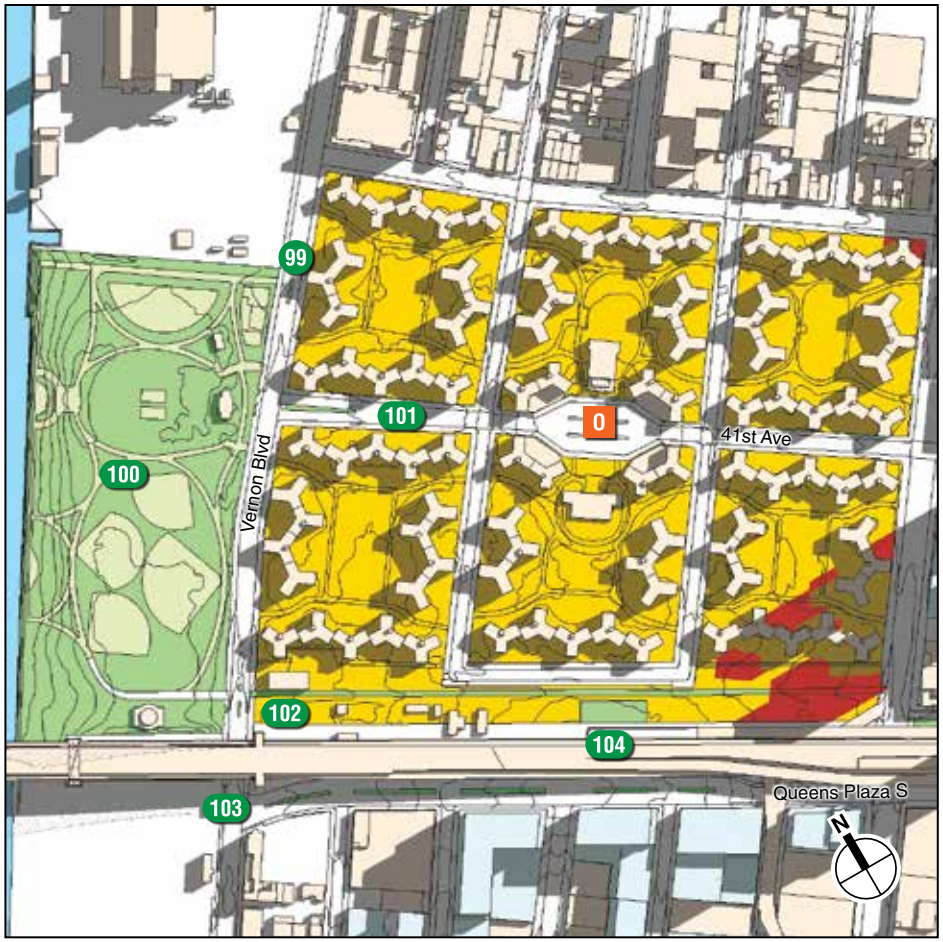
Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

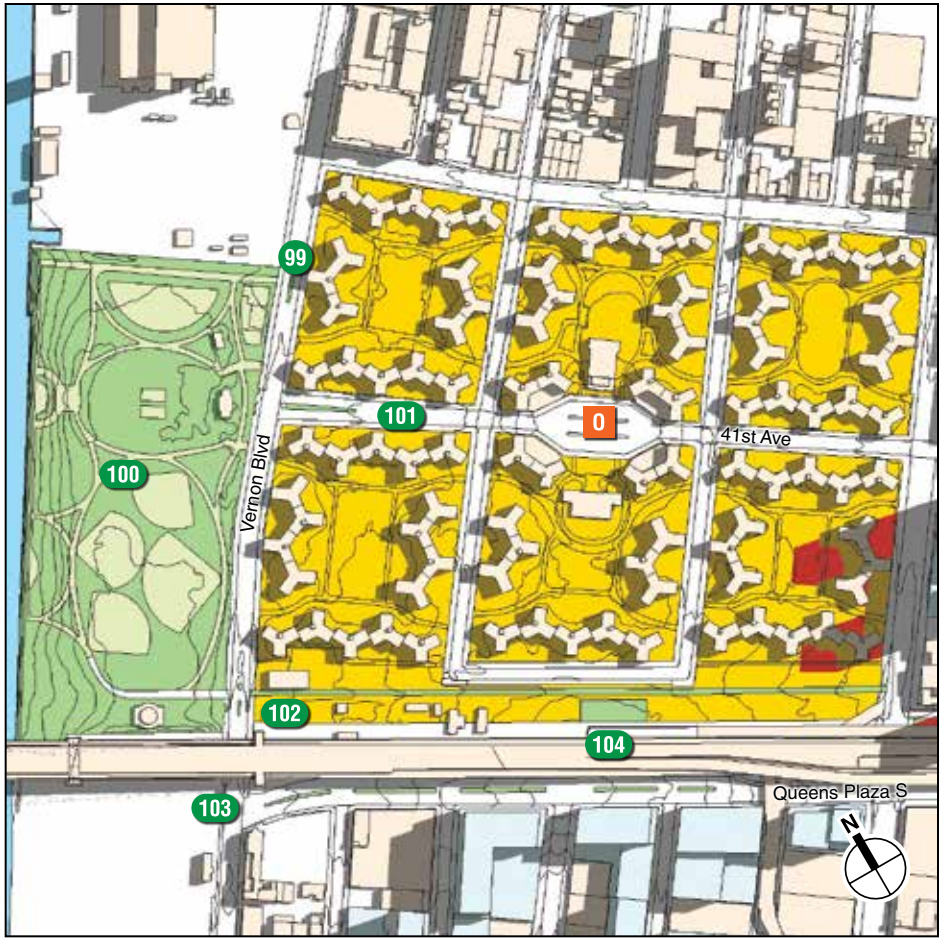
Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

Detailed Analysis
June 21

Figure 6-32



8:00 AM EST (9:00 AM EDT)



9:00 AM EST (10:00 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

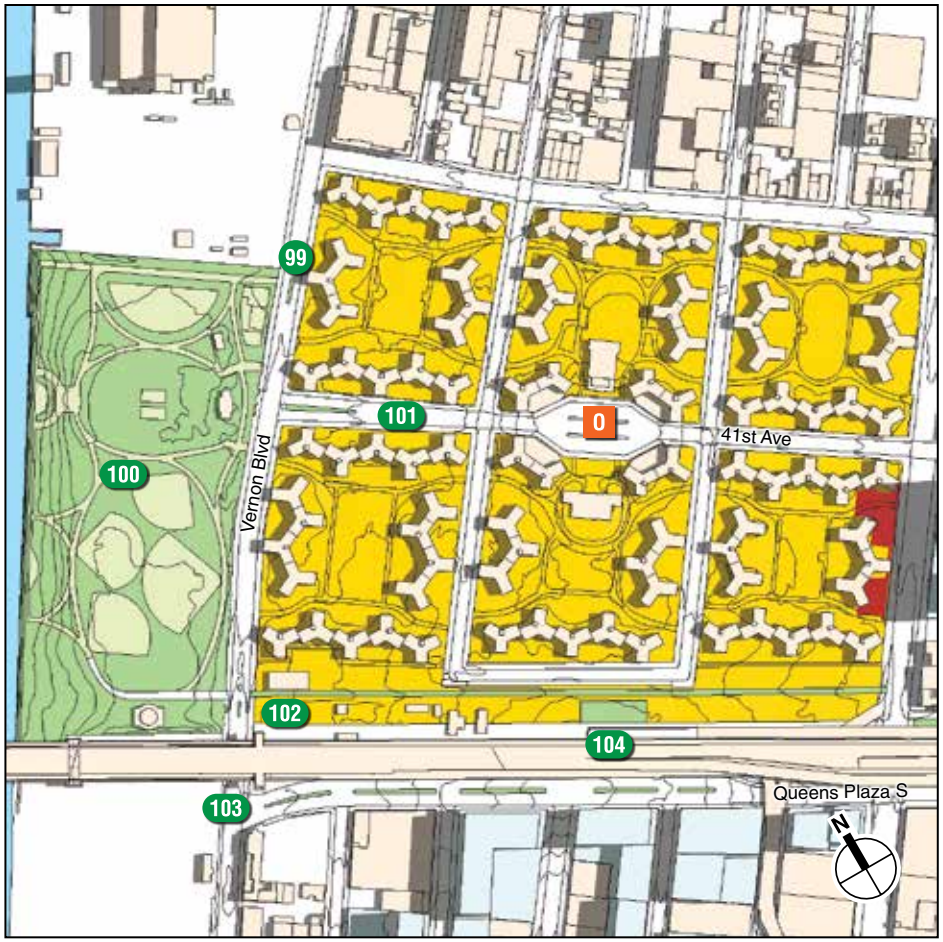
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

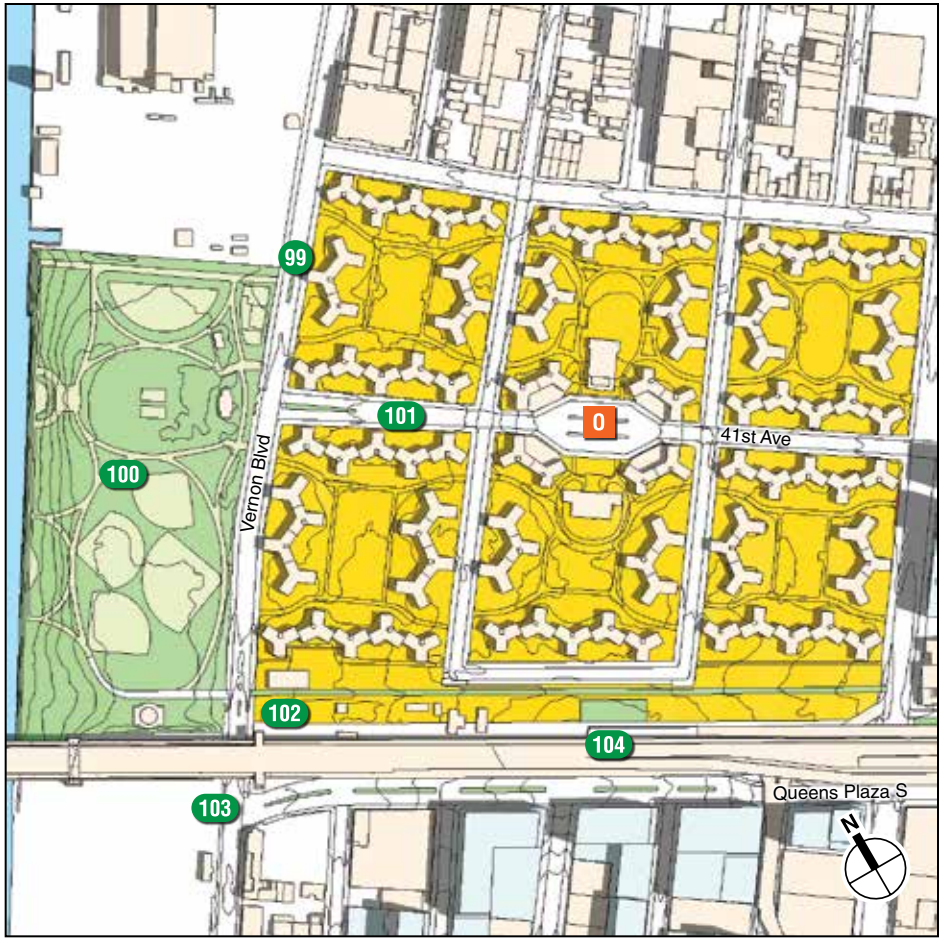
Detailed Analysis
June 21

LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-33



10:00 AM EST (11:00 AM EDT)



10:55 AM EST (11:55 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

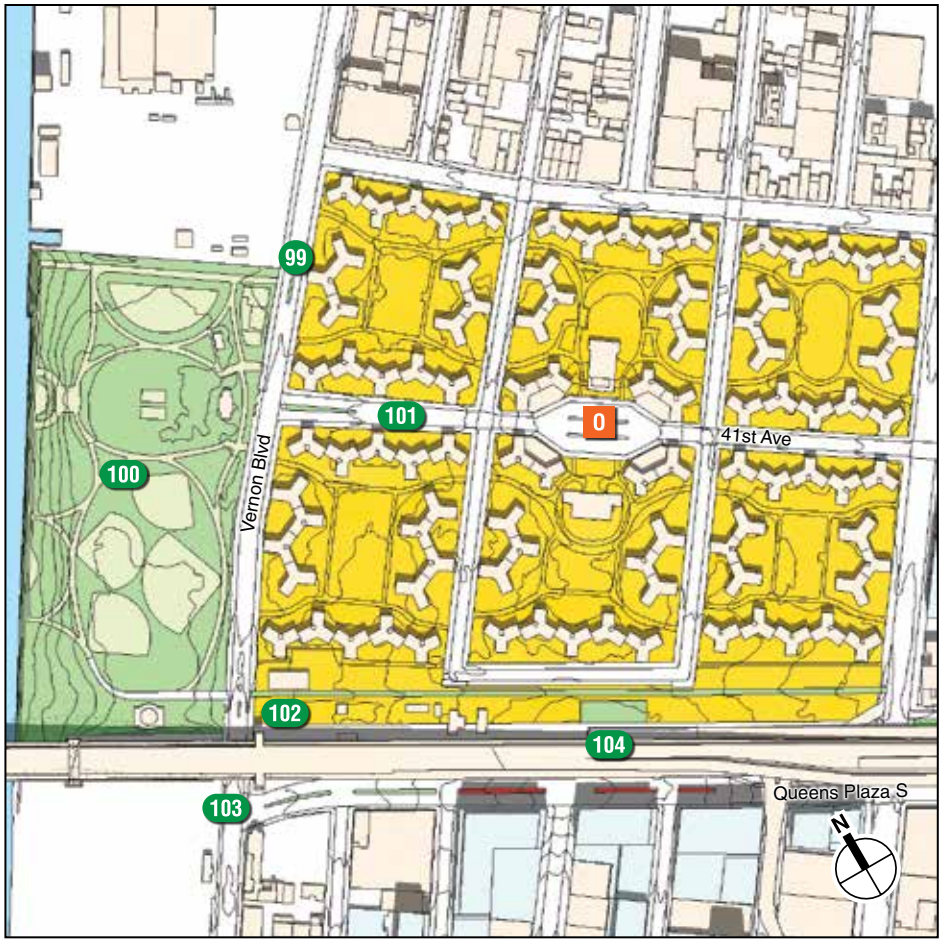
Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

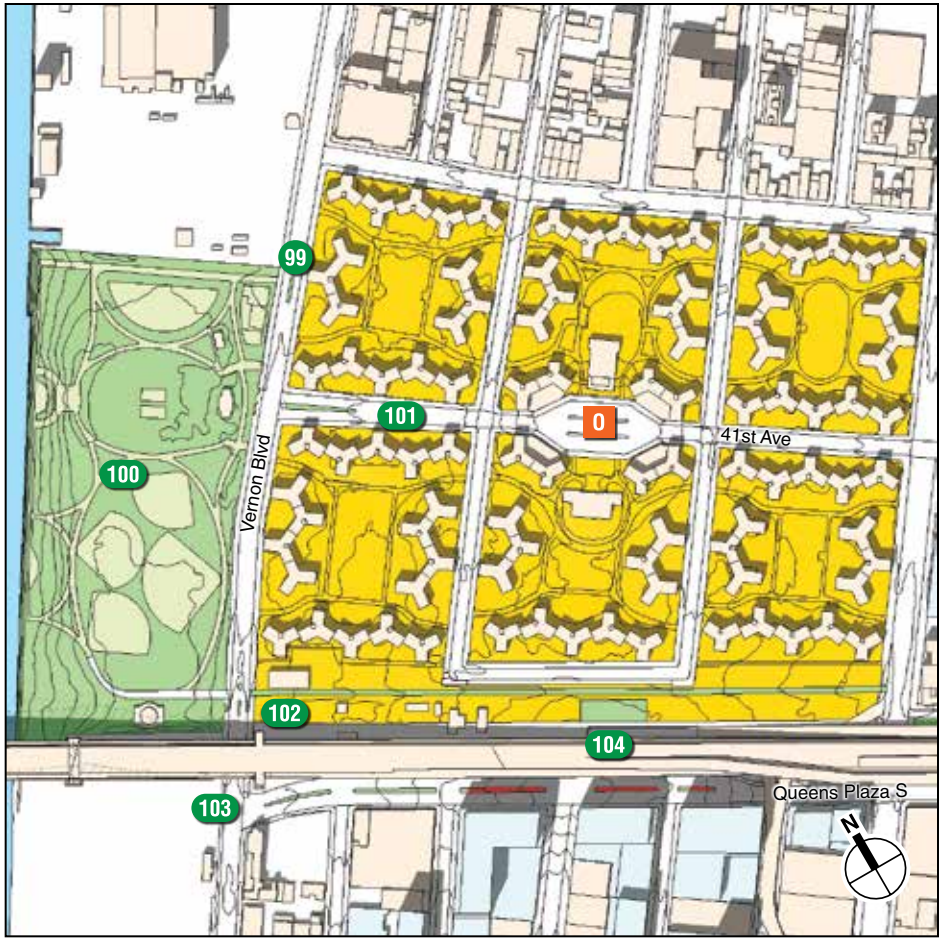
Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

Detailed Analysis
June 21

Figure 6-34



12:30 PM EST (1:30 PM EDT)



1:30 PM EST (2:30 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

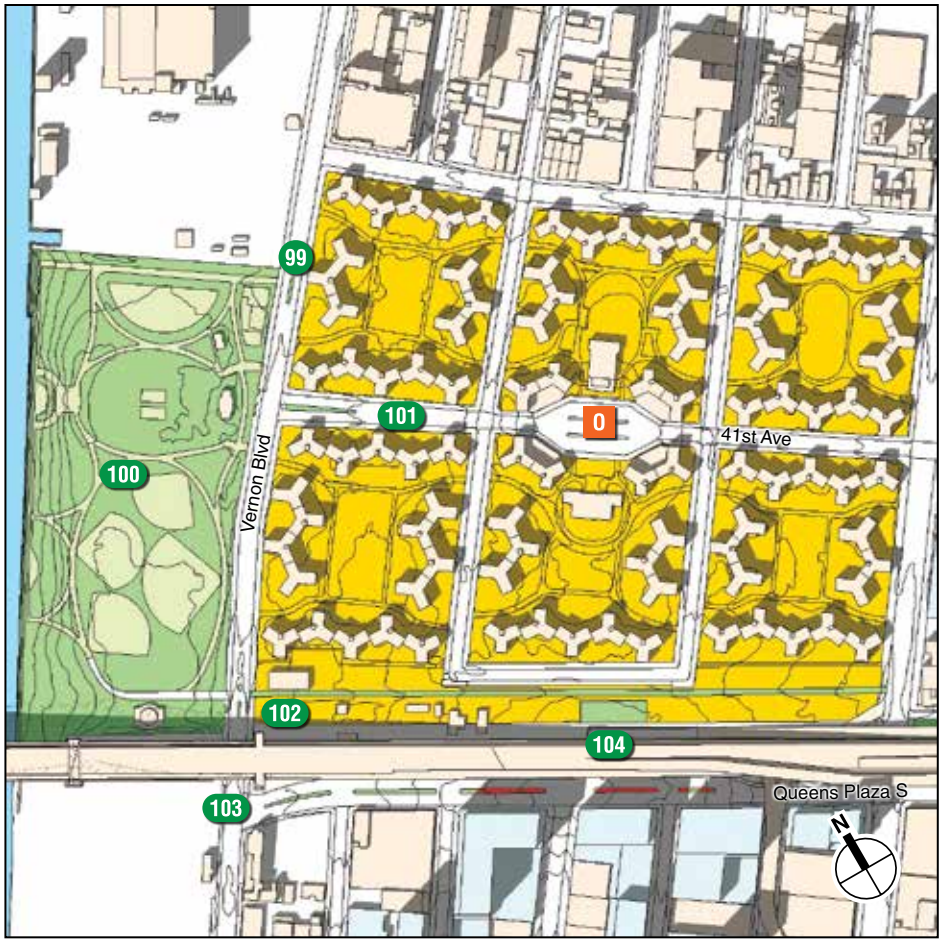
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

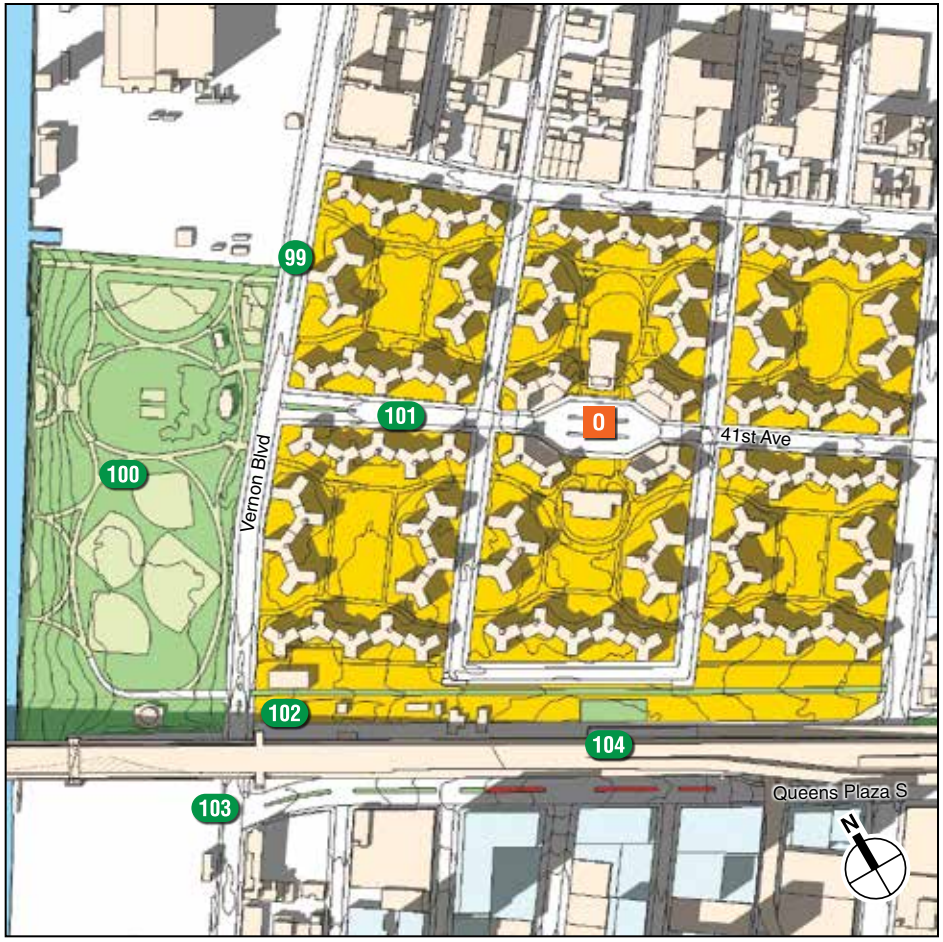
Detailed Analysis
June 21

LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-35



2:30 PM EST (3:30 PM EDT)



3:30 PM EST (4:30 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

Detailed Analysis
June 21

LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-36



4:30 PM EST (5:30 PM EDT)



5:30 PM EST (6:30 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

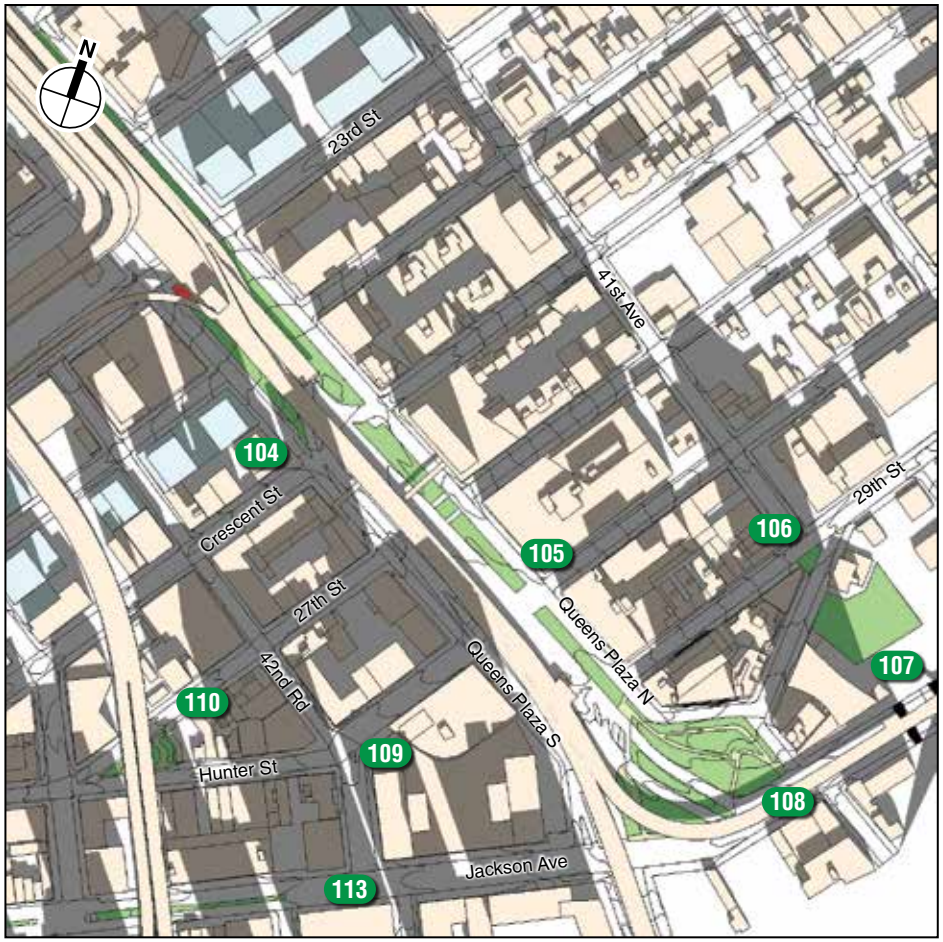
Queensbridge Park (#100), Greenstreet, Vernon Boulevard and 41st Avenue (#101), Greenstreet, Vernon Boulevard and Queensboro Bridge (#102), Greenstreets, Queens Plaza South (#103), and Queensbridge Houses (O)

Detailed Analysis
June 21

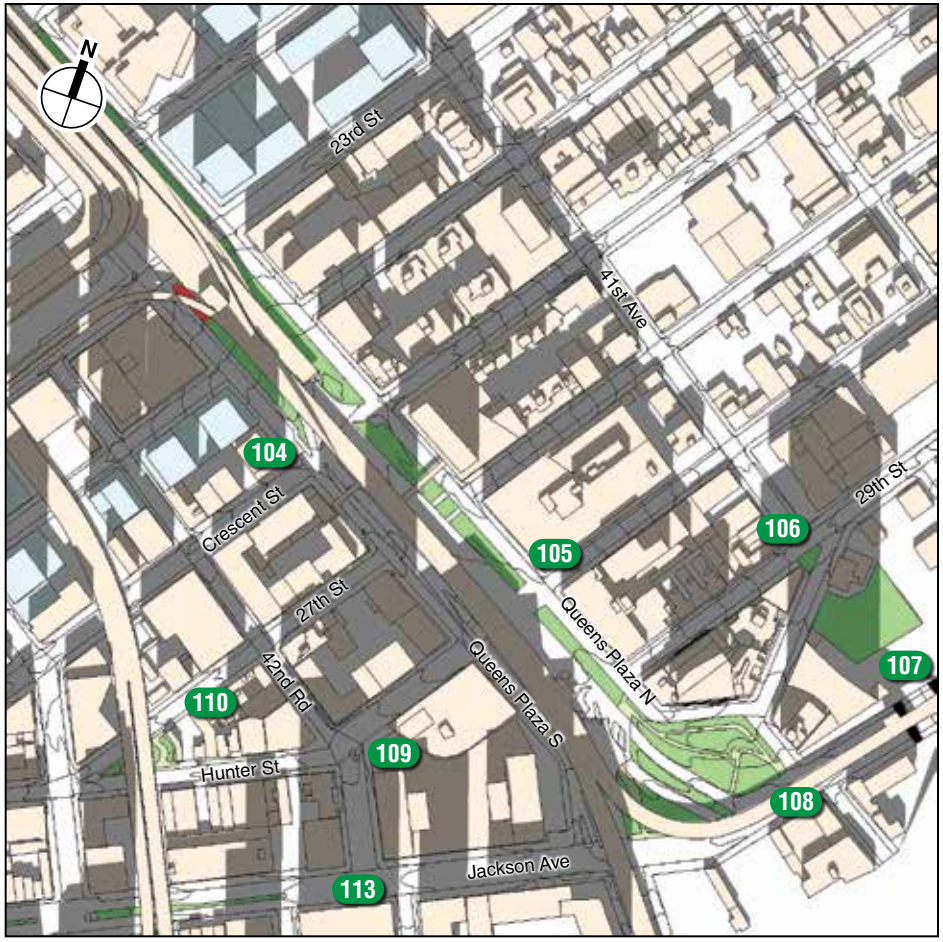
LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-37

2.21.25



10:15 AM EST (11:15 AM EDT)



11:15 AM EST (12:15 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

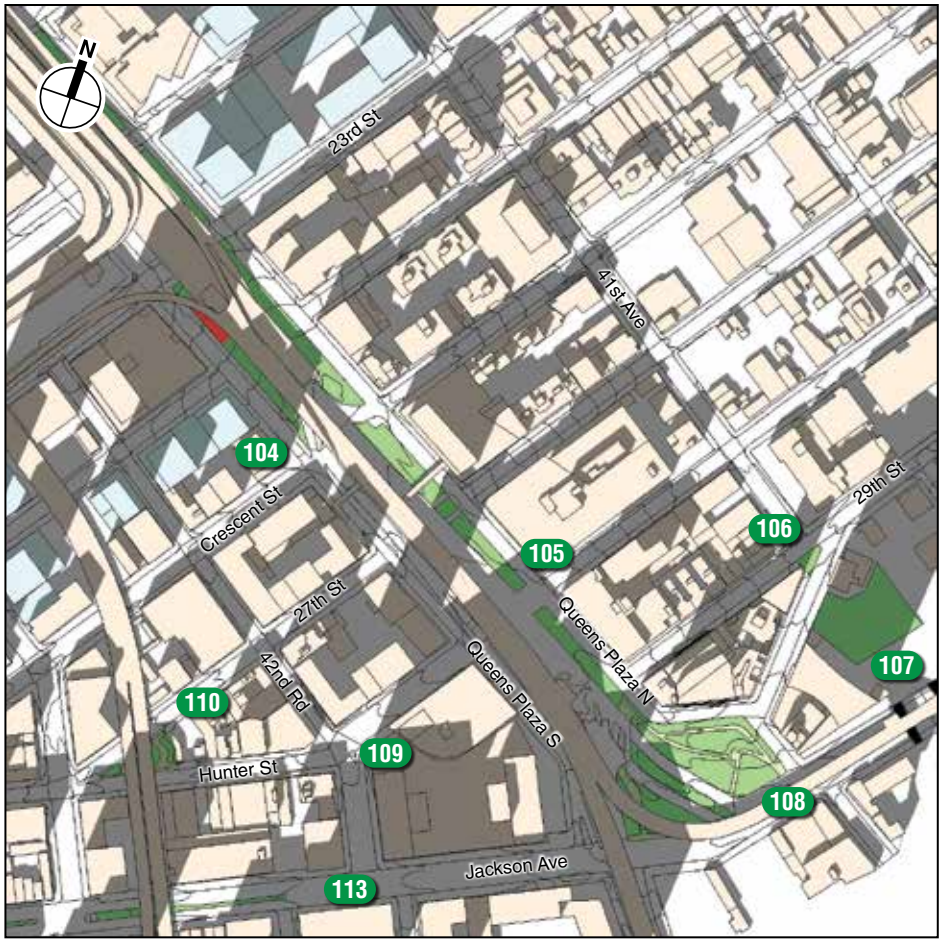
Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

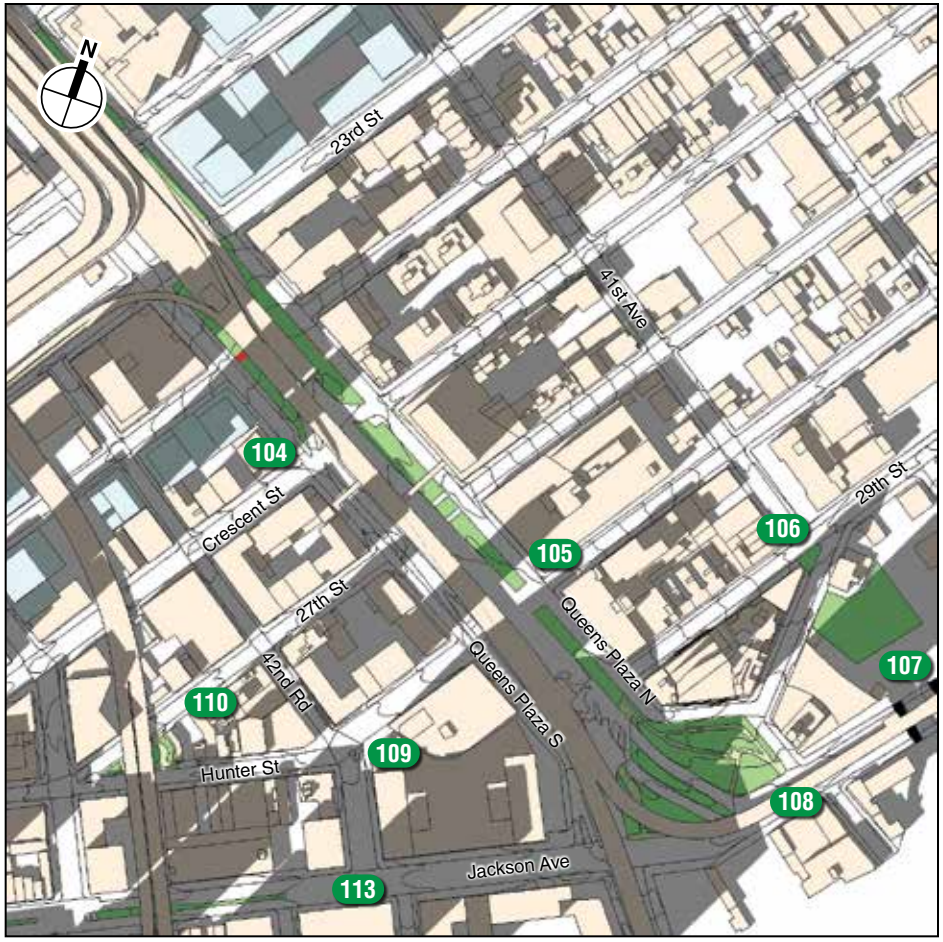
Pollinator Place Garden, Queens Plaza South (#104), Queens Plaza North Greenstreets and Bikeway (#105), Greenstreet, 29th Street and 41st Avenue (#106), Sven Park (#107), and Dutch Kills Green (#108)

Detailed Analysis
March 21 / September 21

Figure 6-38



12:15 PM EST (1:15 PM EDT)



1:15 PM EST (2:15 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

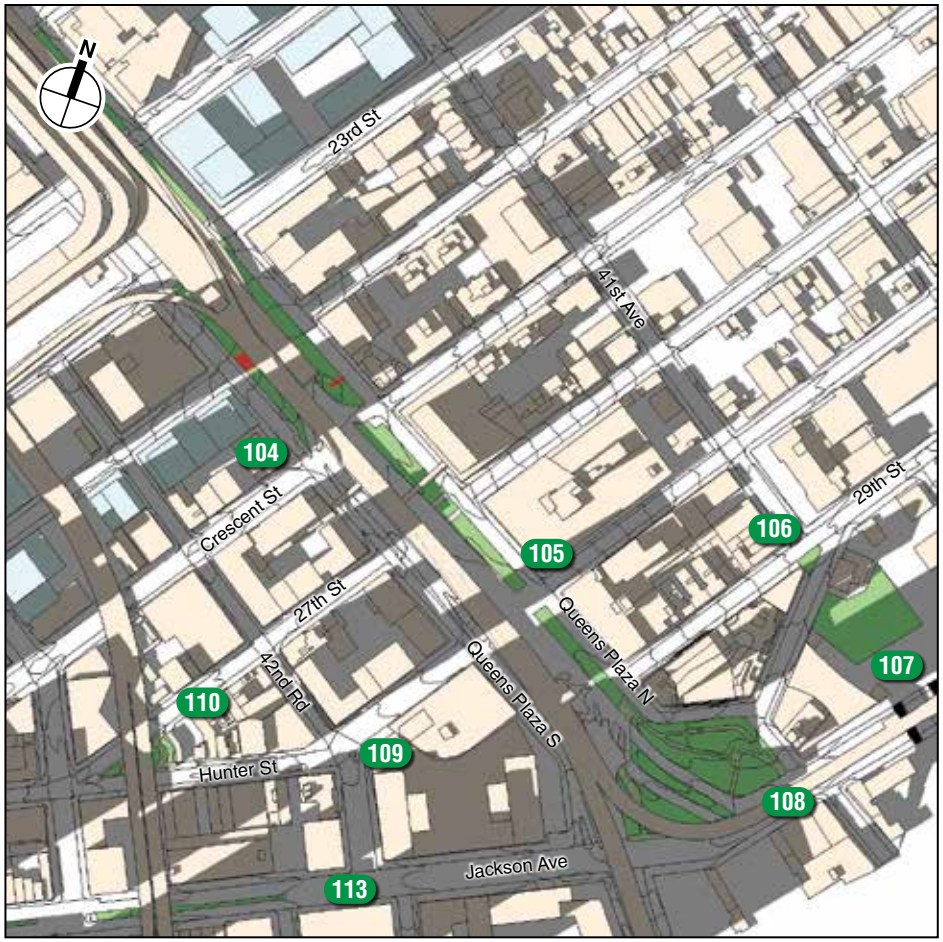
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Pollinator Place Garden, Queens Plaza South (#104), Queens Plaza North Greenstreets and Bikeway (#105), Greenstreet, 29th Street and 41st Avenue (#106), Sven Park (#107), and Dutch Kills Green (#108)

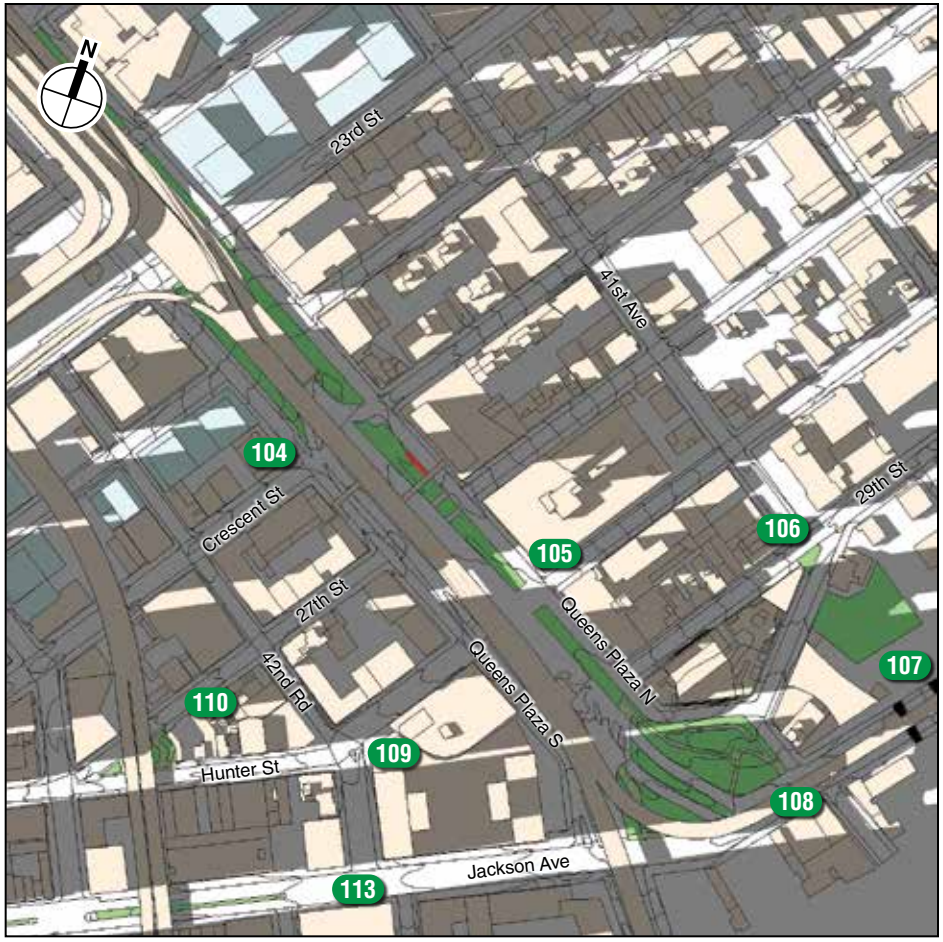
Detailed Analysis
March 21 / September 21

Figure 6-39

2.21.25



2:00 PM EST (3:00 PM EDT)



3:30 PM EST (4:30 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

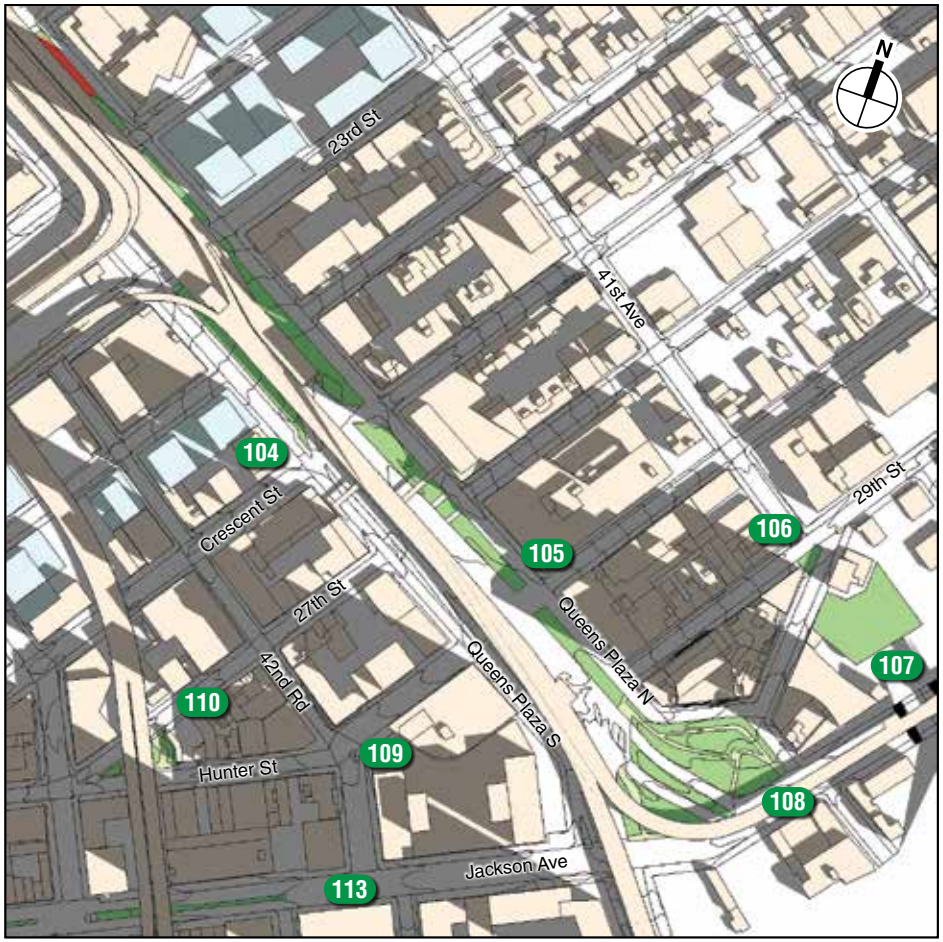
Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

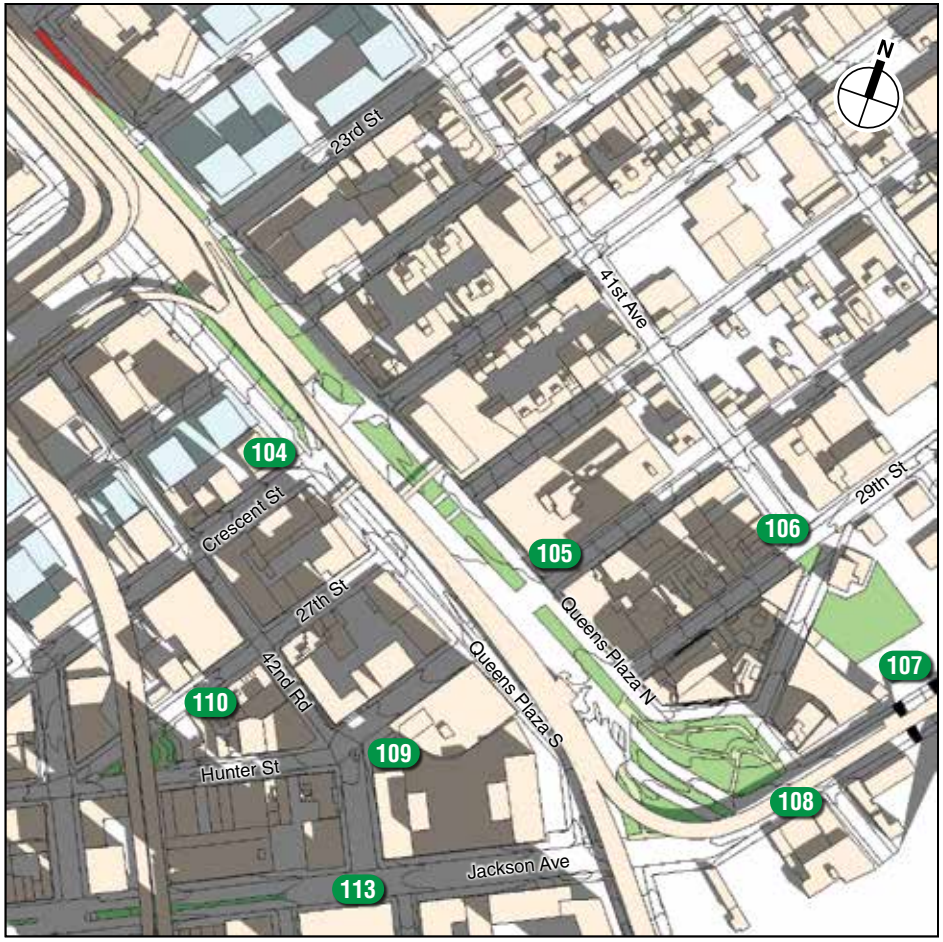
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Pollinator Place Garden, Queens Plaza South (#104), Queens Plaza North Greenstreets and Bikeway (#105), Greenstreet, 29th Street and 41st Avenue (#106), Sven Park (#107), and Dutch Kills Green (#108)

Detailed Analysis
March 21 / September 21



8:15 AM EST (9:15 AM EDT)



9:00 AM EST (10:00 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

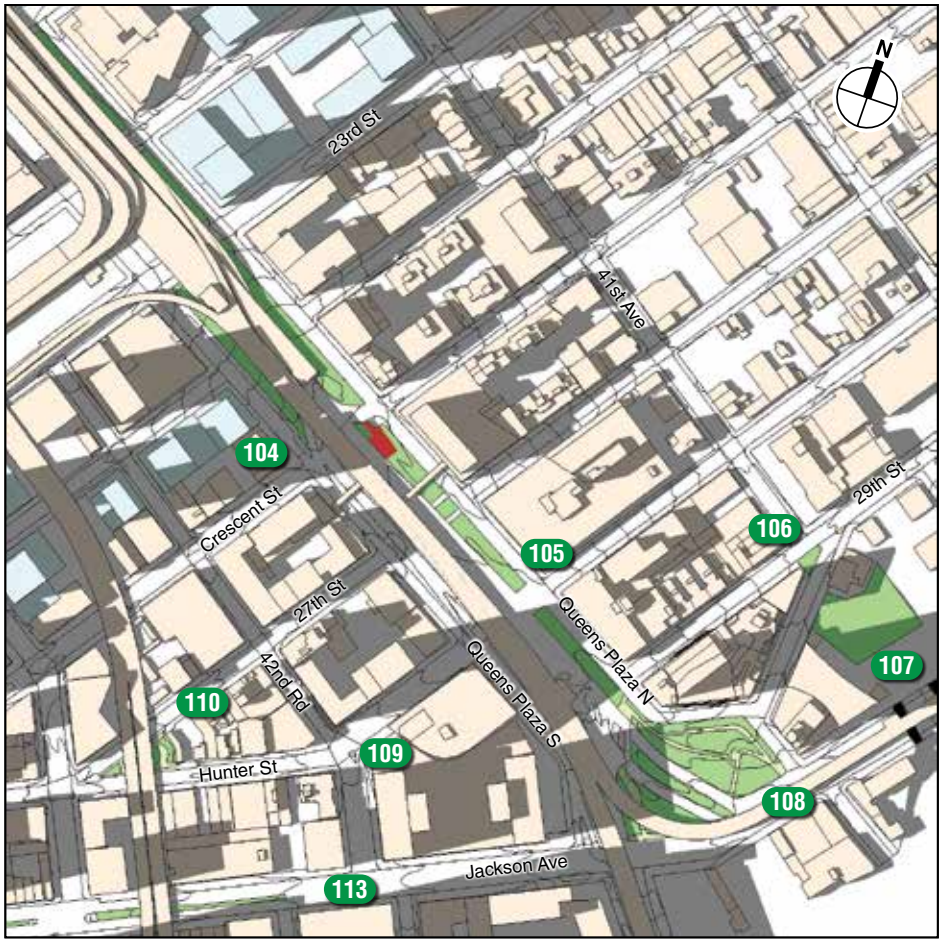
Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

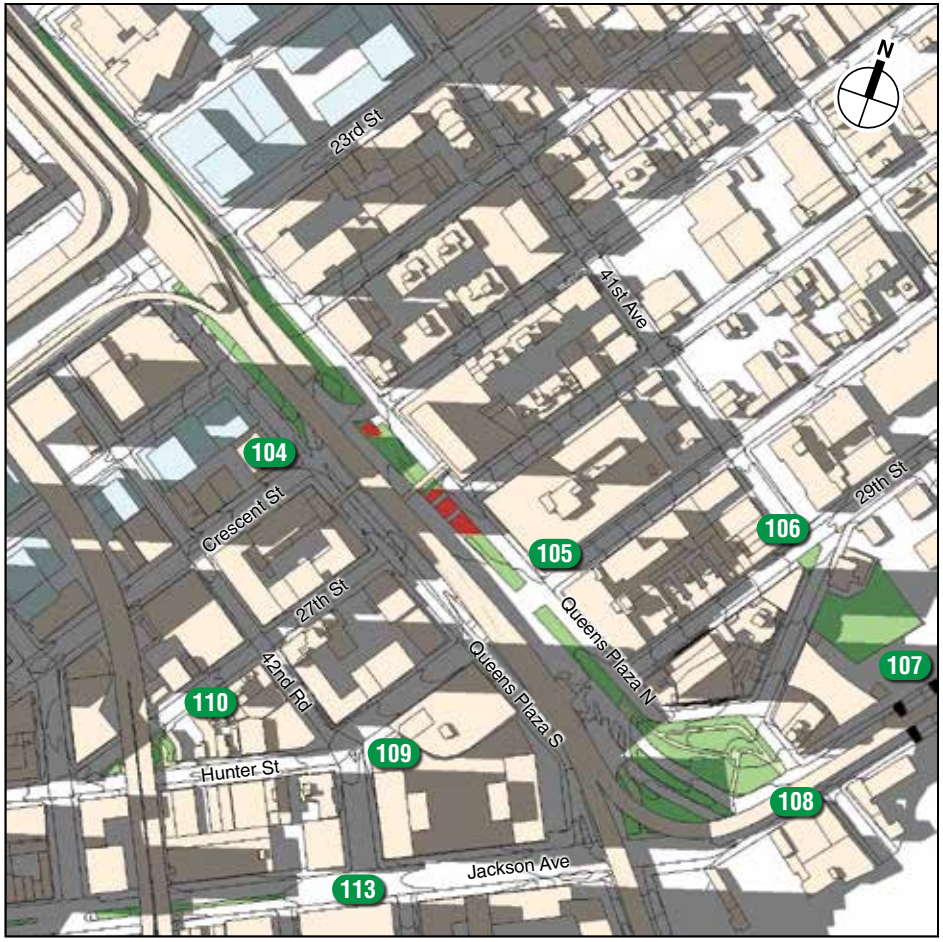
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Pollinator Place Garden, Queens Plaza South (#104), Queens Plaza North Greenstreets and Bikeway (#105), Greenstreet, 29th Street and 41st Avenue (#106), Sven Park (#107), and Dutch Kills Green (#108)

Detailed Analysis
May 6 / August 6



2:00 PM EST (3:00 PM EDT)



3:00 PM EST (4:00 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

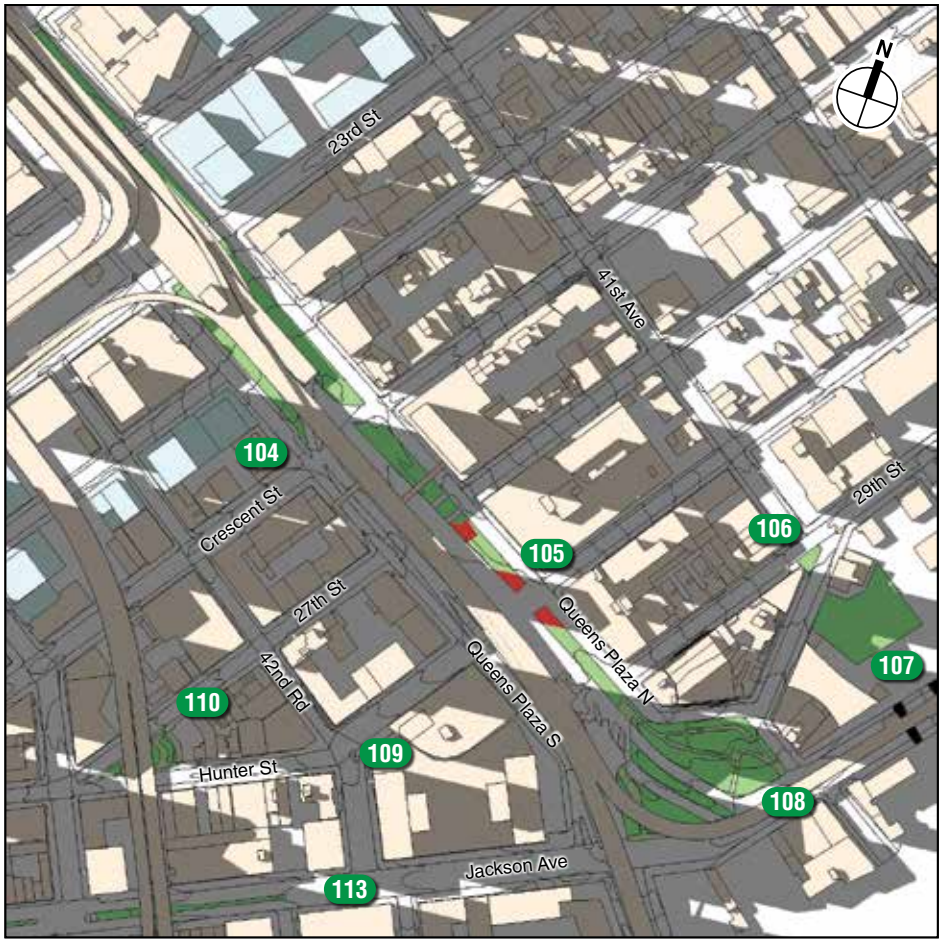
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Pollinator Place Garden, Queens Plaza South (#104), Queens Plaza North Greenstreets and Bikeway (#105), Greenstreet, 29th Street and 41st Avenue (#106), Sven Park (#107), and Dutch Kills Green (#108)

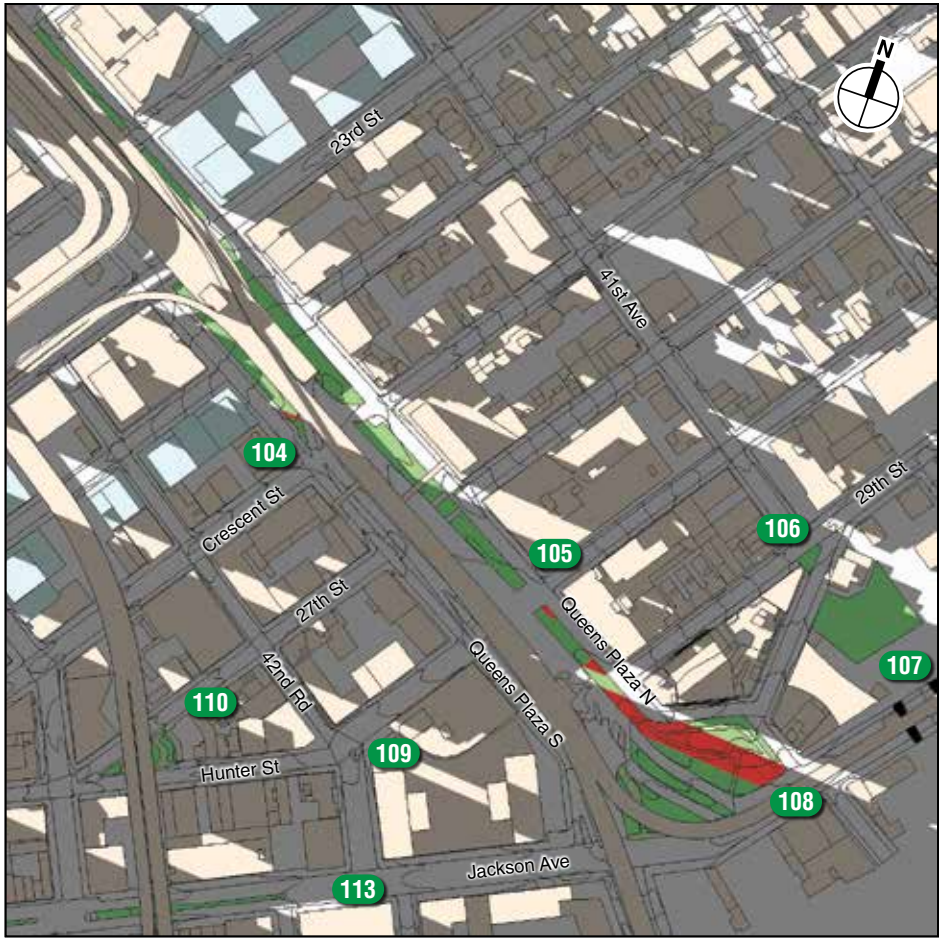
Detailed Analysis
May 6 / August 6

Figure 6-42

2.21.25



4:00 PM EST (5:00 PM EDT)



5:00 PM EST (6:00 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

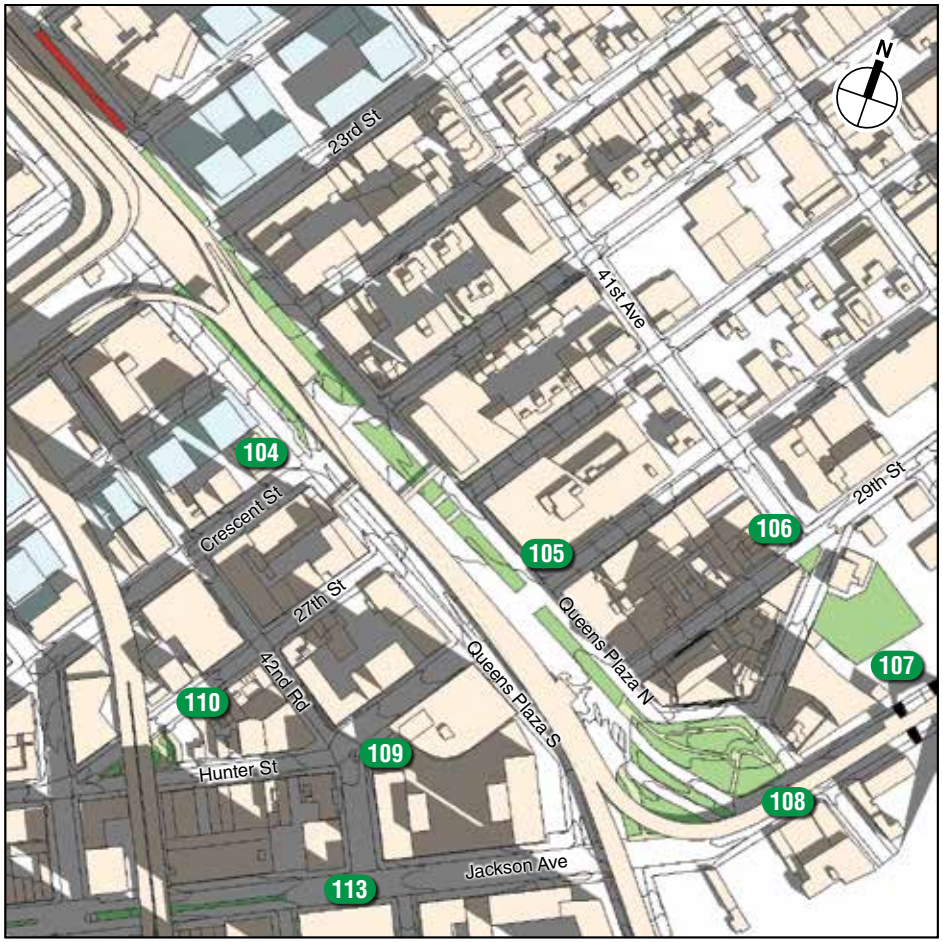
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Pollinator Place Garden, Queens Plaza South (#104), Queens Plaza North Greenstreets and Bikeway (#105), Greenstreet, 29th Street and 41st Avenue (#106), Sven Park (#107), and Dutch Kills Green (#108)

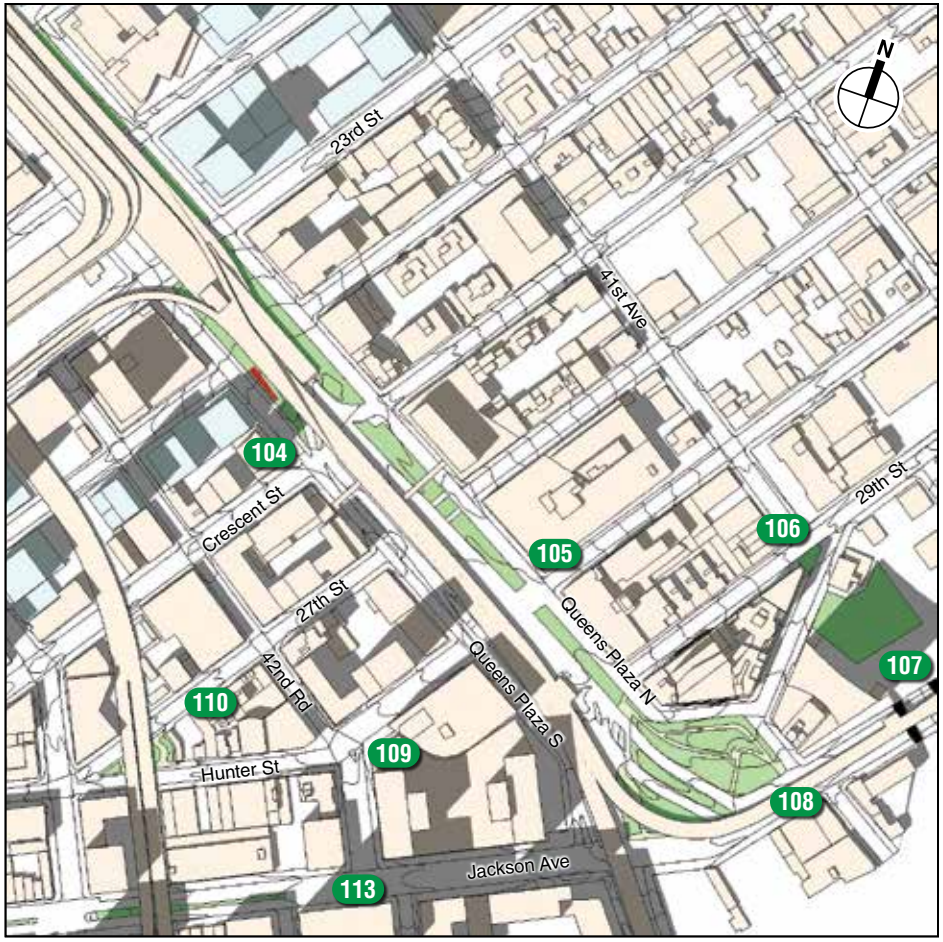
Detailed Analysis
May 6 / August 6

LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-43



9:15 AM EST (10:15 AM EDT)



12:30 PM EST (1:30 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

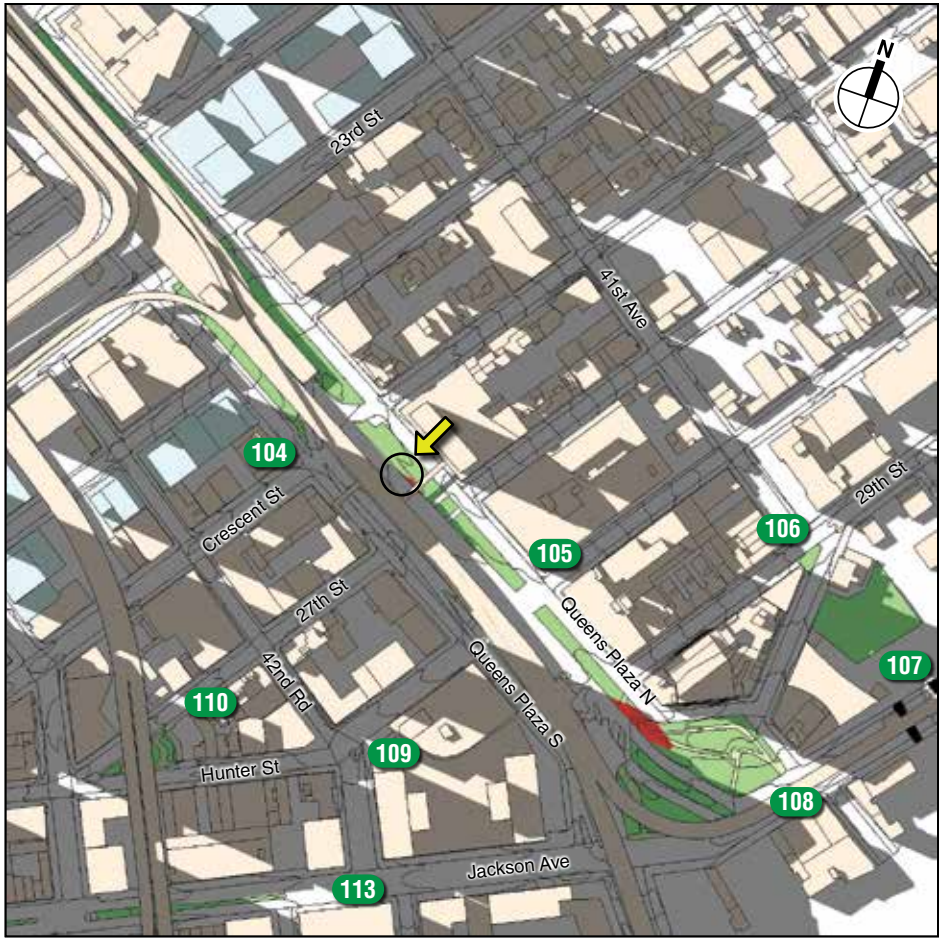
Pollinator Place Garden, Queens Plaza South (#104), Queens Plaza North Greenstreets and Bikeway (#105), Greenstreet, 29th Street and 41st Avenue (#106), Sven Park (#107), and Dutch Kills Green (#108)

Detailed Analysis
June 21

Figure 6-44



4:00 PM EST (5:00 PM EDT)



4:30 PM EST (5:30 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Pollinator Place Garden, Queens Plaza South (#104), Queens Plaza North Greenstreets and Bikeway (#105), Greenstreet, 29th Street and 41st Avenue (#106), Sven Park (#107), and Dutch Kills Green (#108)

Detailed Analysis
June 21

Figure 6-45

2.21.25



5:00 PM EST (6:00 PM EDT)



5:30 PM EST (6:30 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

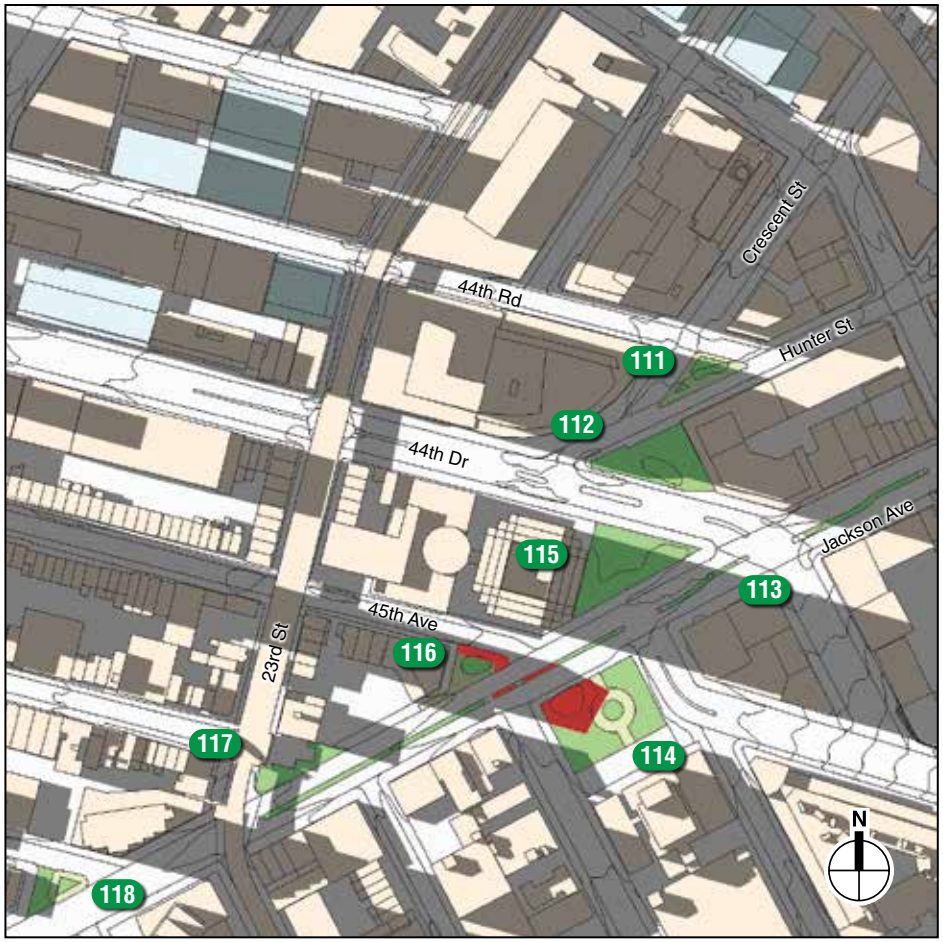
Pollinator Place Garden, Queens Plaza South (#104), Queens Plaza North Greenstreets and Bikeway (#105), Greenstreet, 29th Street and 41st Avenue (#106), Sven Park (#107), and Dutch Kills Green (#108)

Detailed Analysis
June 21

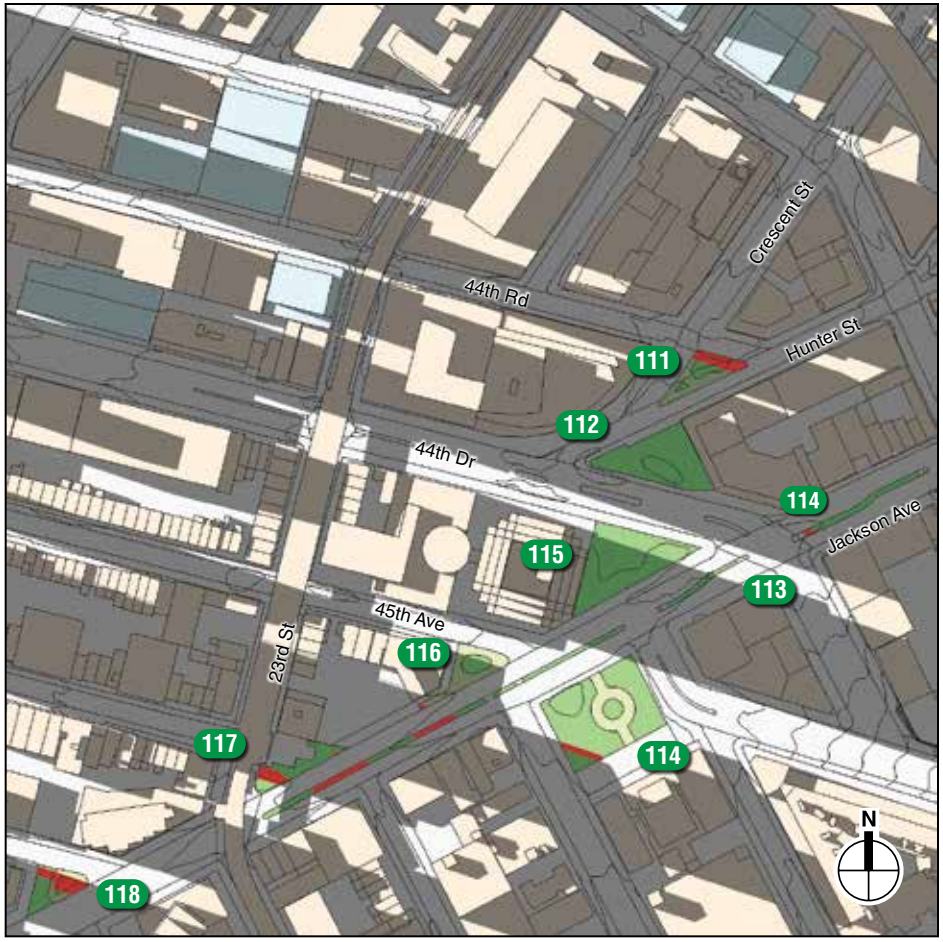
LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-46

2.21.25



5:40 PM EST (6:40 PM EDT)



6:00 PM EST (7:00 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

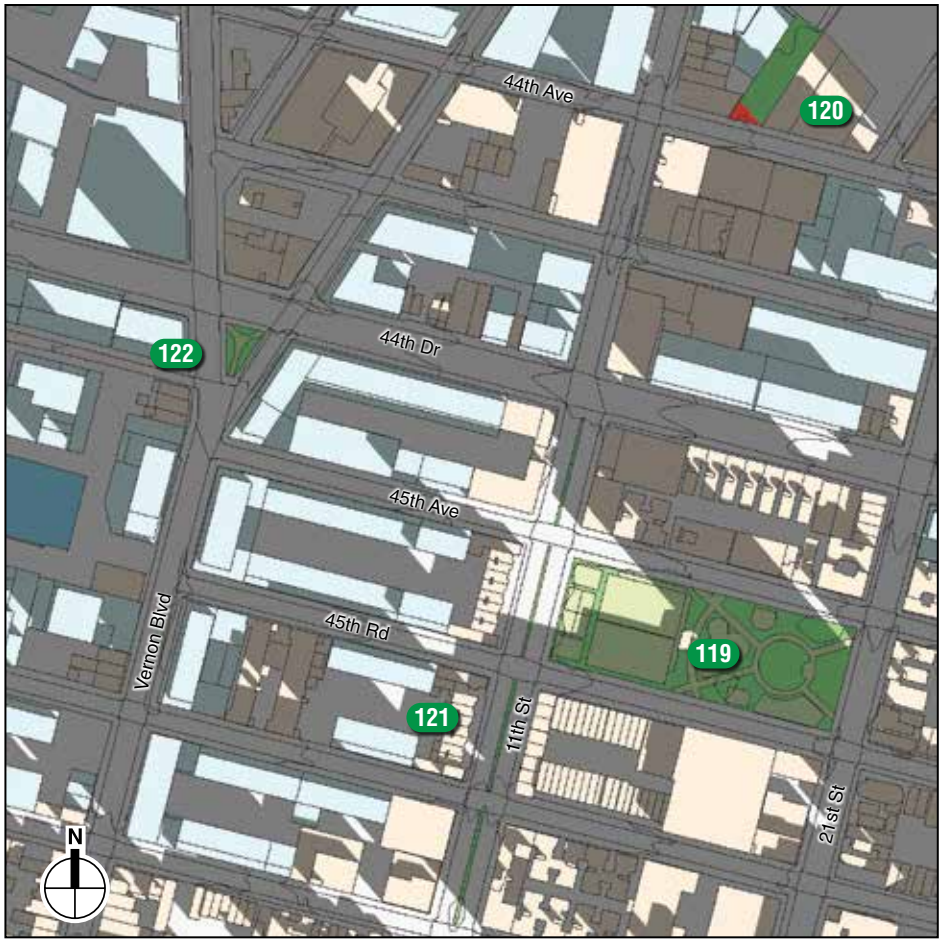
Sundial Park (#111), Rafferty Triangle (#112), Jackson Avenue Medians (#113), Court Square Park (#114), McKenna Triangle (#116), Short Triangle (#117), and 46th Avenue Plaza (#118)

Detailed Analysis
June 21

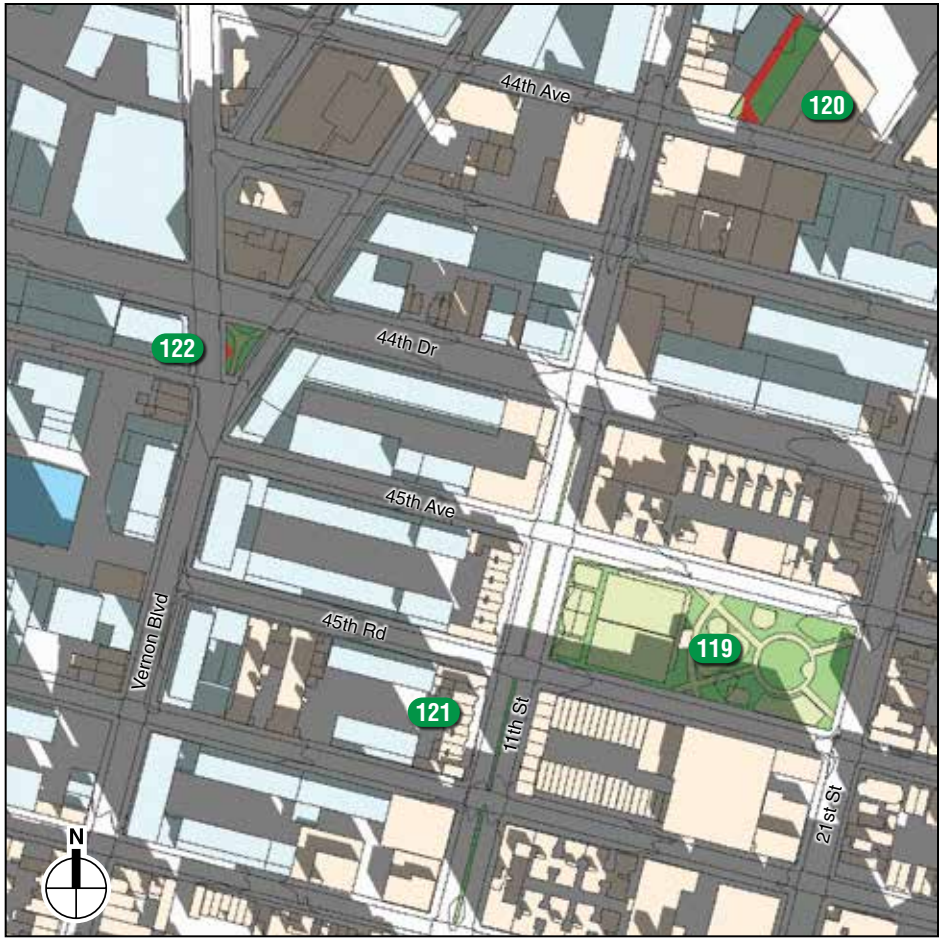
LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-47

2.21.25



9:00 AM



10:00 AM

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

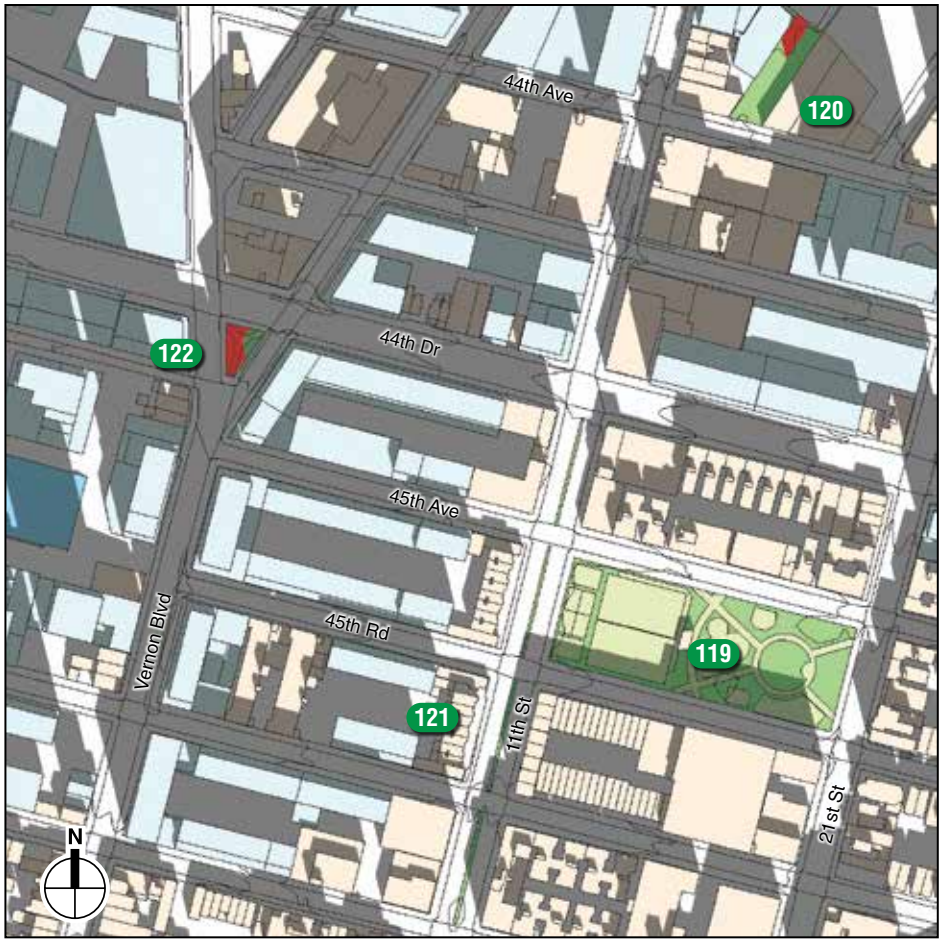
NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.

Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

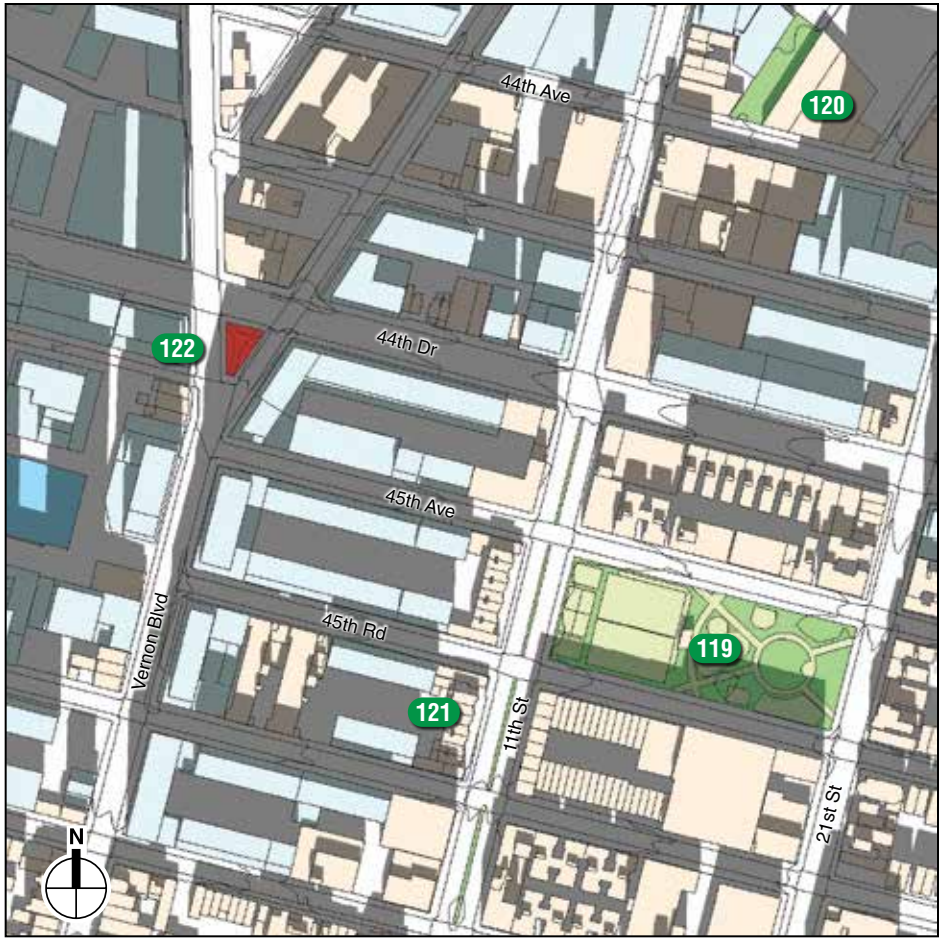
Detailed Analysis
December 21

Figure 6-48

2.21.25



11:00 AM



12:00 PM

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

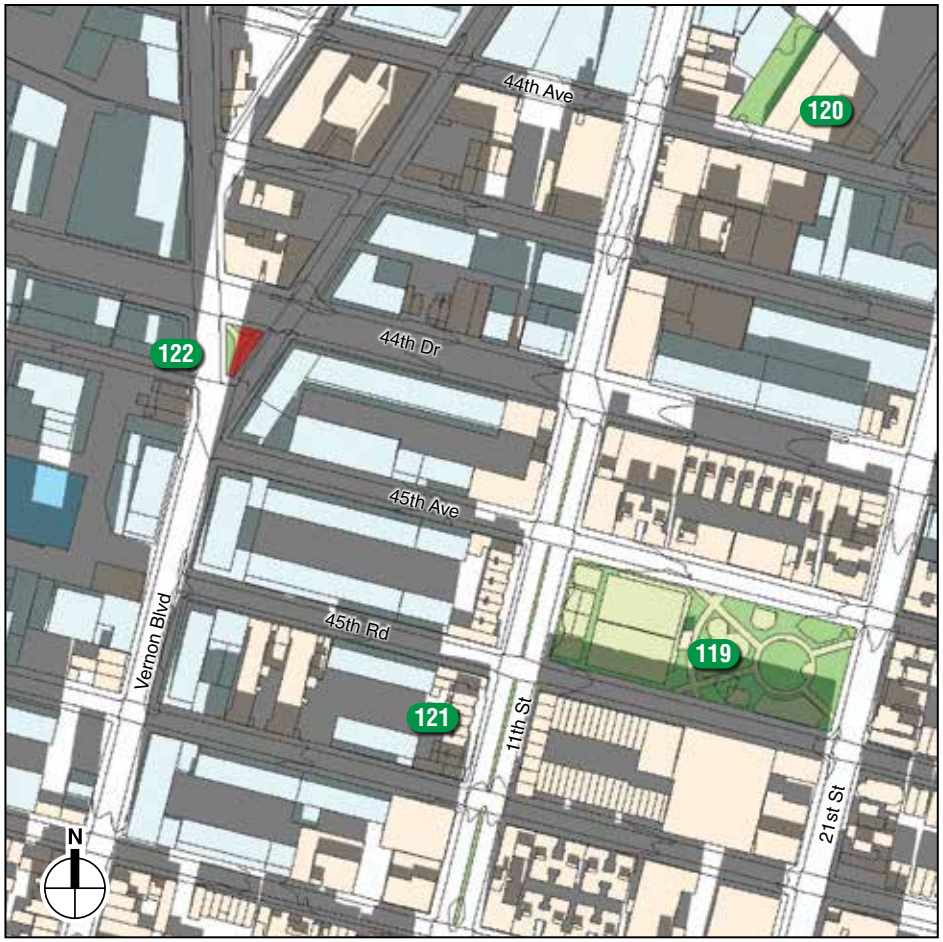
Natural Resources (refer to Table 6-1)

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.

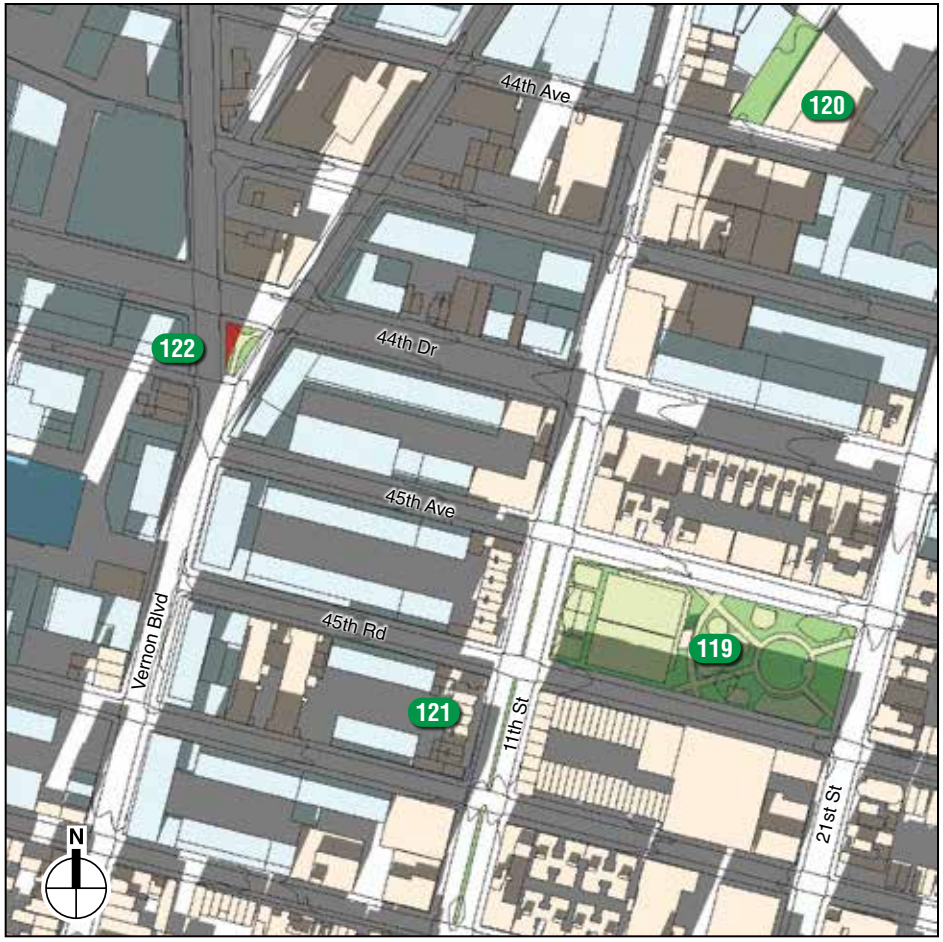
Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

Detailed Analysis
December 21

Figure 6-49



12:30 PM



1:30 PM

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

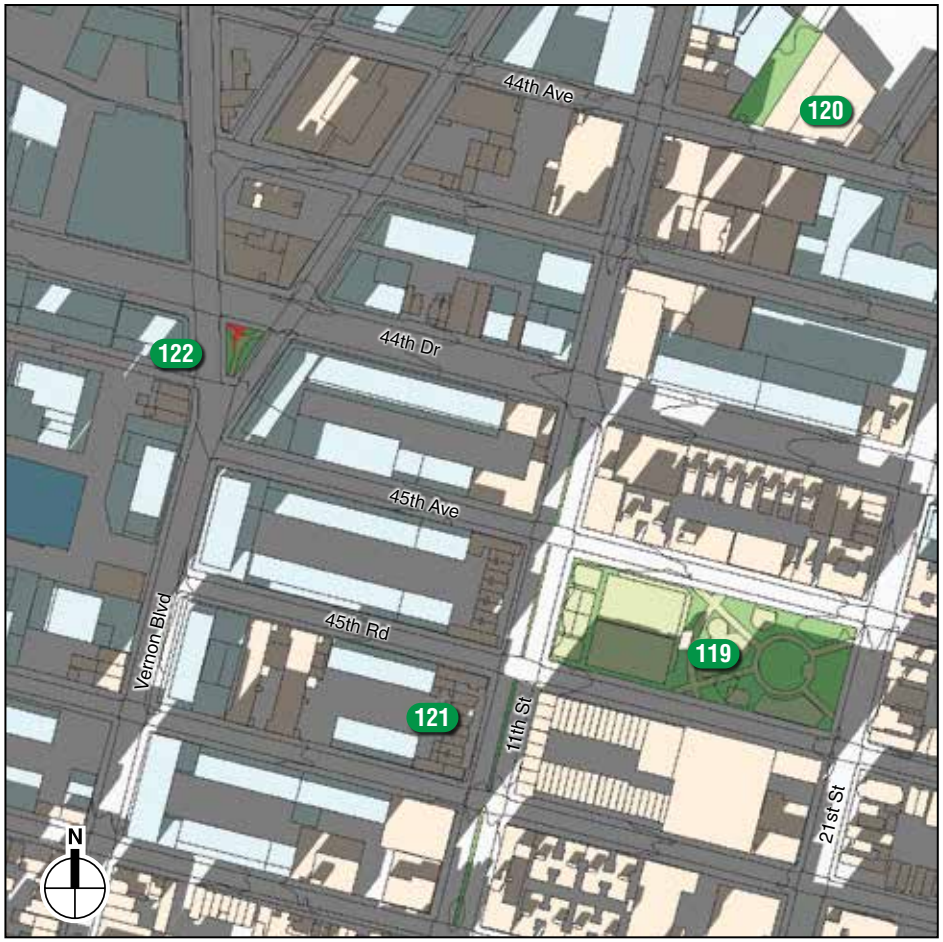
Natural Resources (refer to Table 6-1)

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.

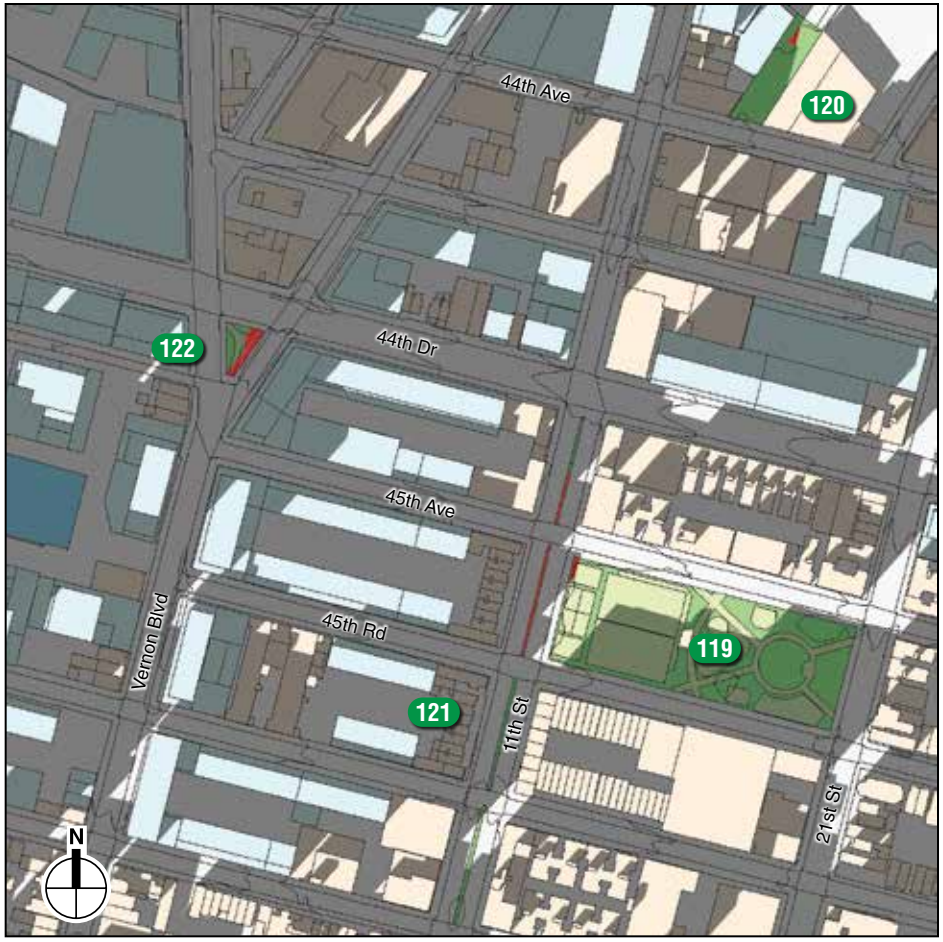
Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

Detailed Analysis
December 21

Figure 6-50



2:30 PM



2:53 PM

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

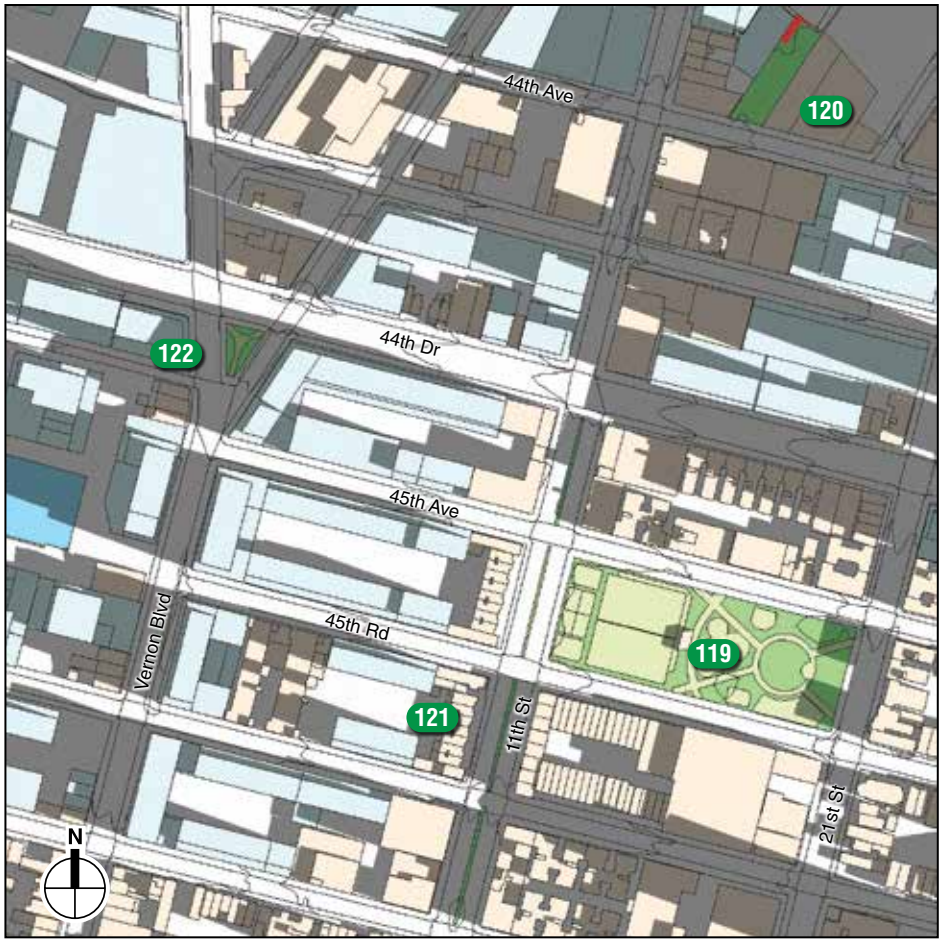
Natural Resources (refer to Table 6-1)

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.

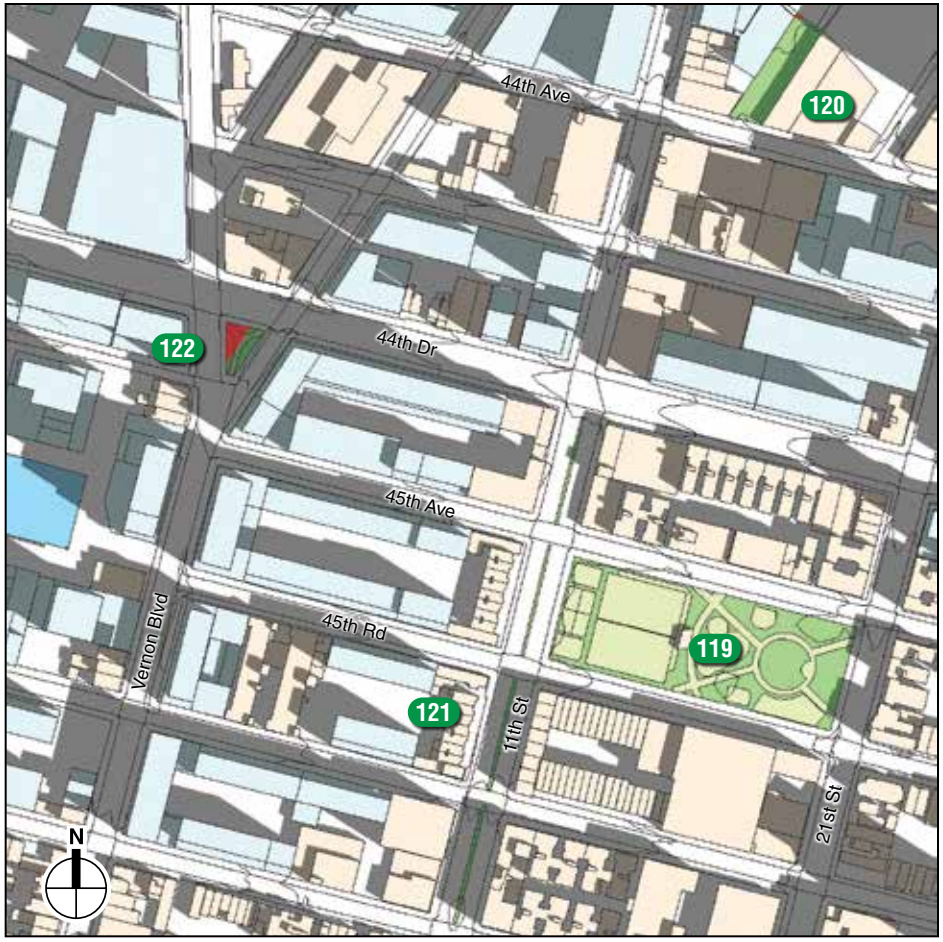
Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

Detailed Analysis
December 21

Figure 6-51



8:00 AM EST (9:00 AM EDT)



9:00 AM EST (10:00 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

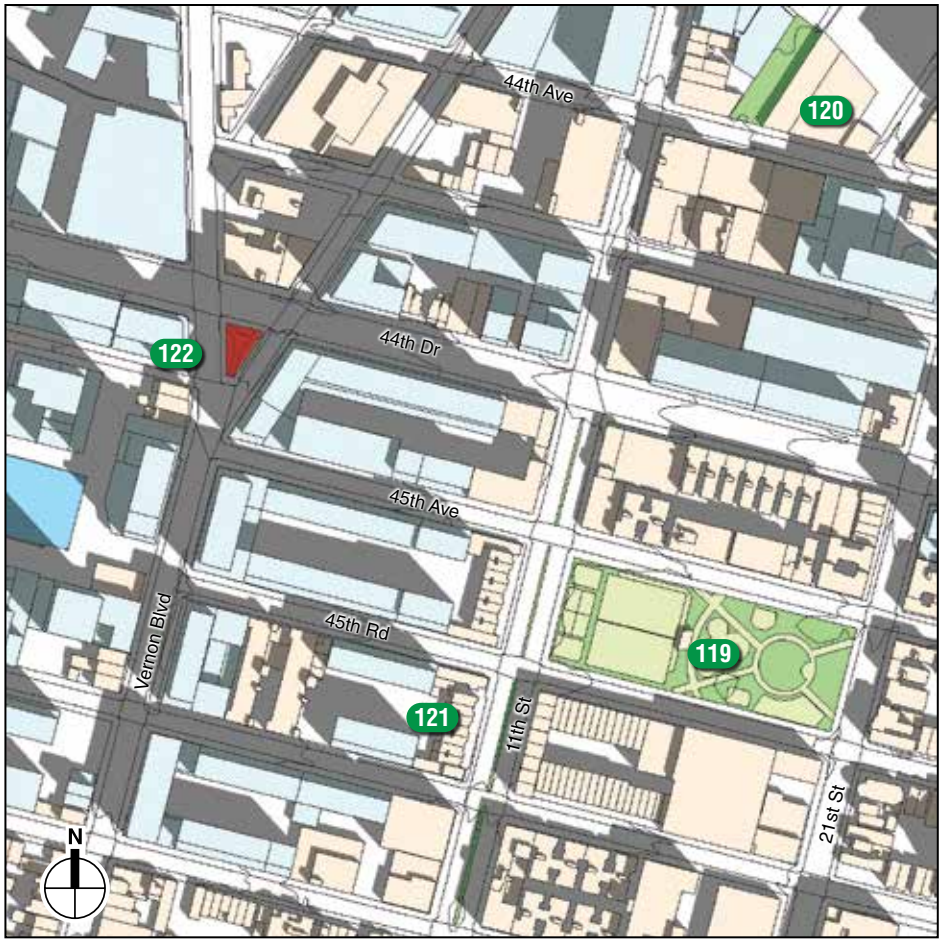
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

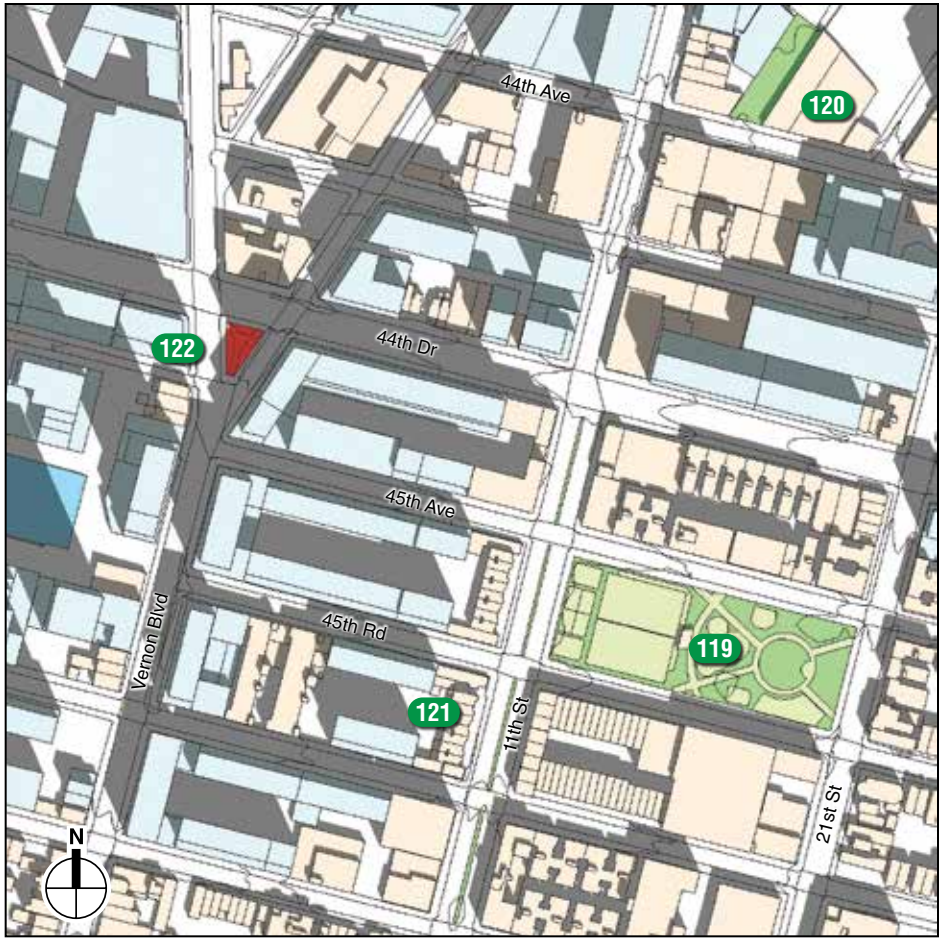
Detailed Analysis
March 21 / September 21

Figure 6-52

2.21.25



10:00 AM EST (11:00 AM EDT)



11:00 AM EST (12:00 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

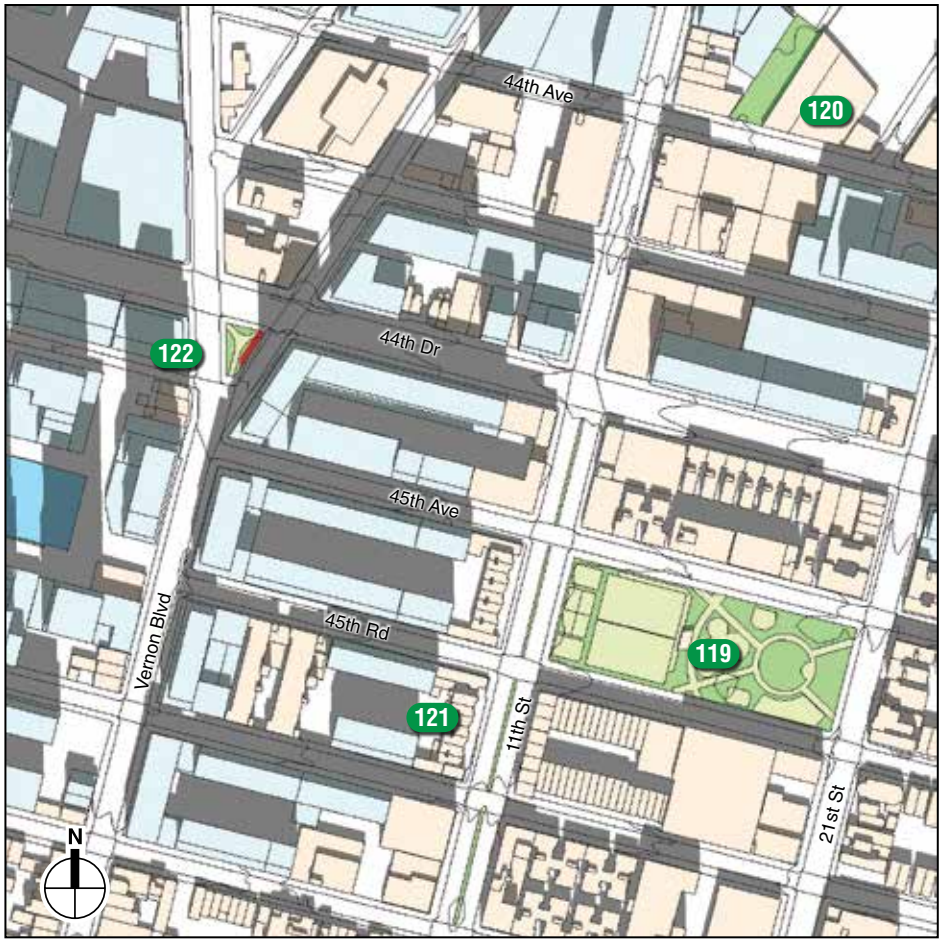
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

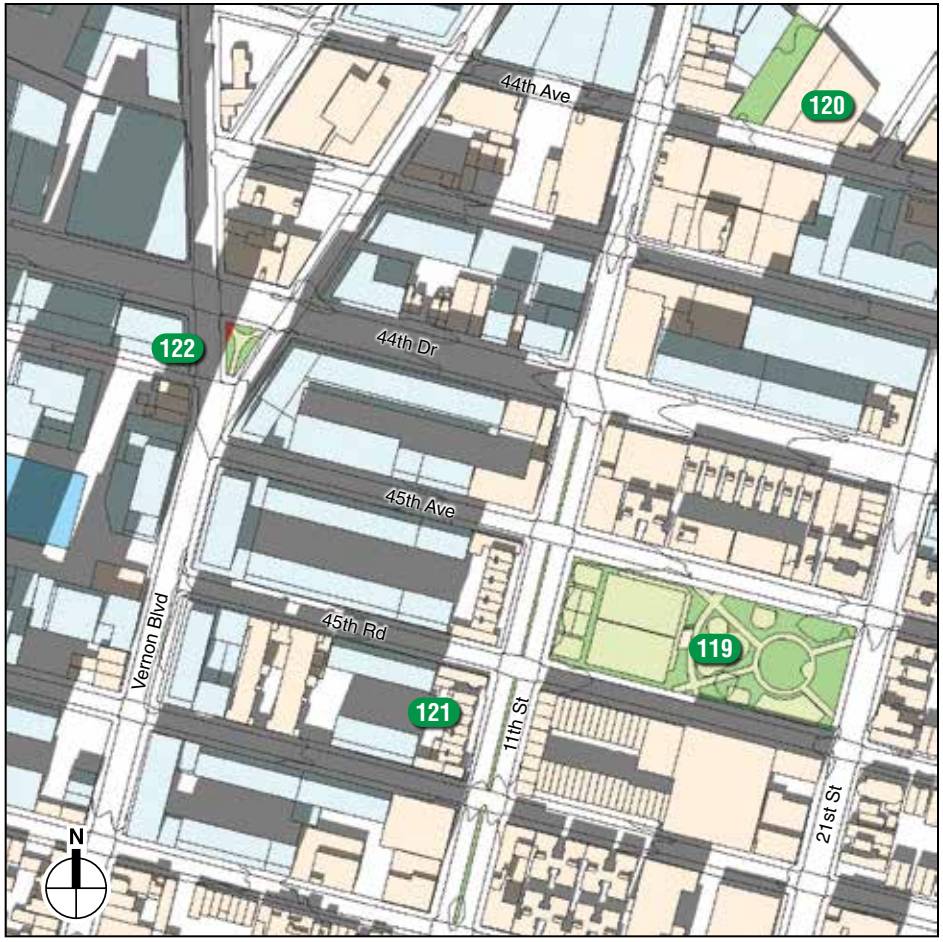
Detailed Analysis
March 21 / September 21

LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-53



12:00 PM EST (1:00 PM EDT)



1:00 PM EST (2:00 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

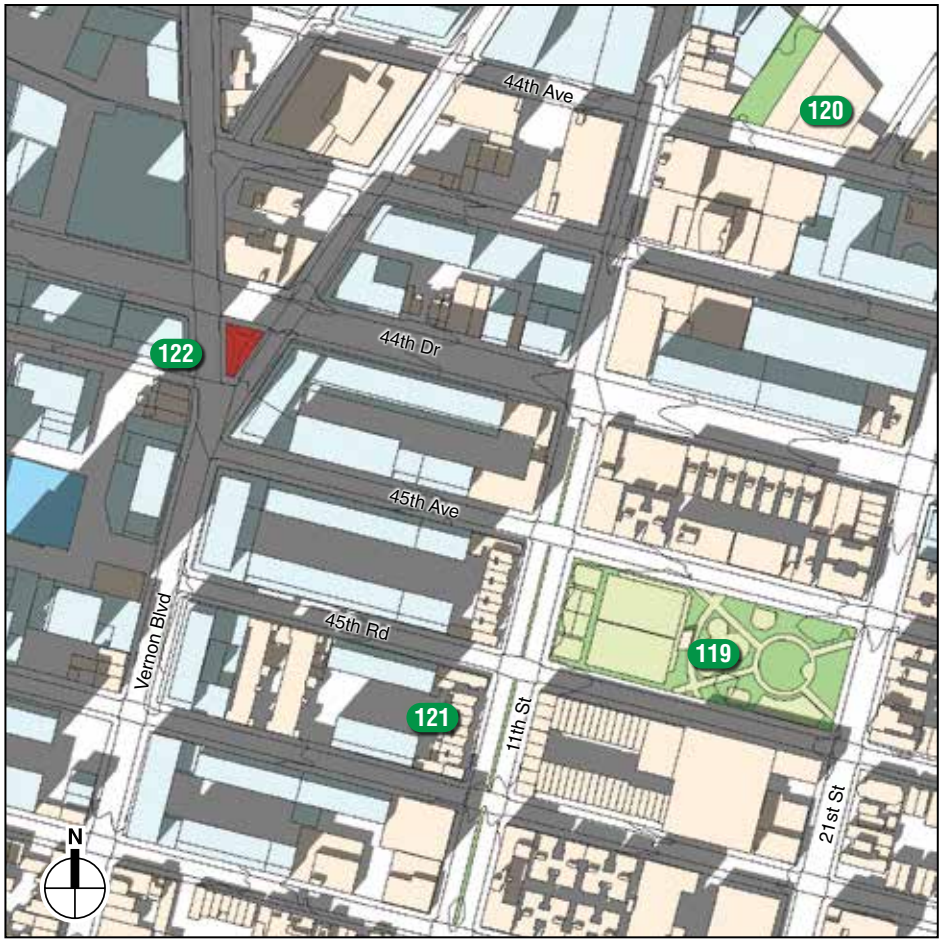
Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

Detailed Analysis
March 21 / September 21

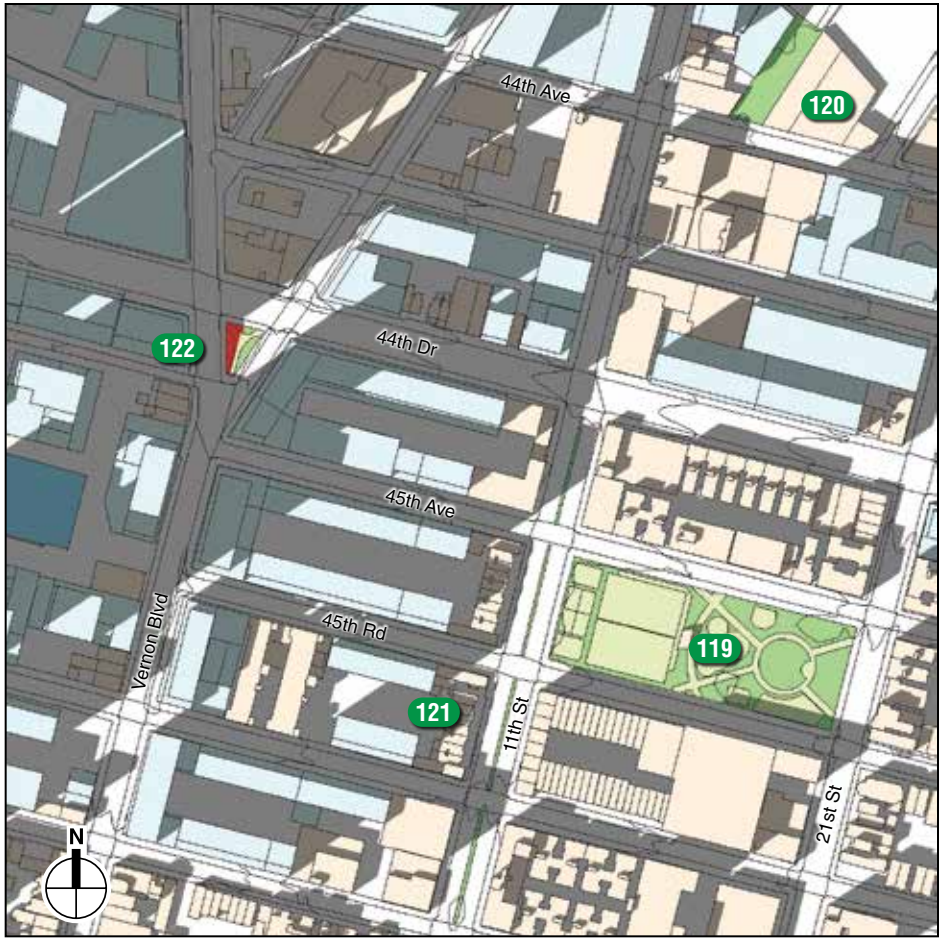
LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-54

2.21.25



2:00 PM EST (3:00 PM EDT)



3:00 PM EST (4:00 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

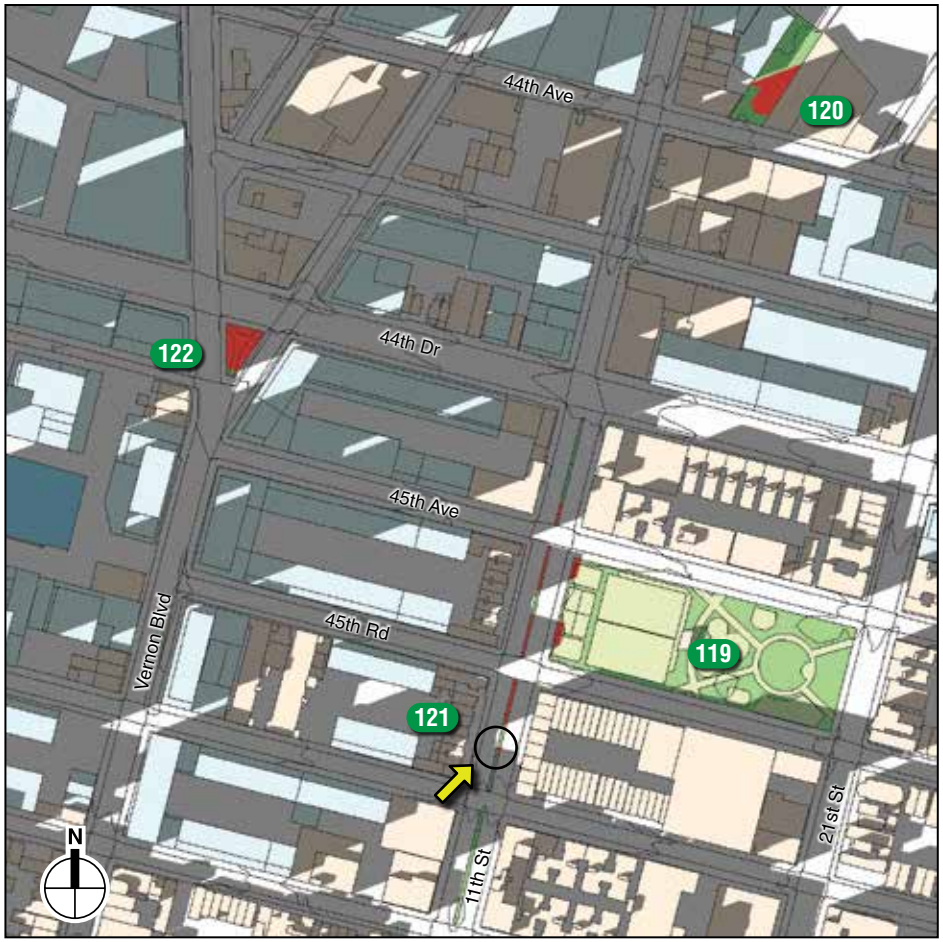
Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

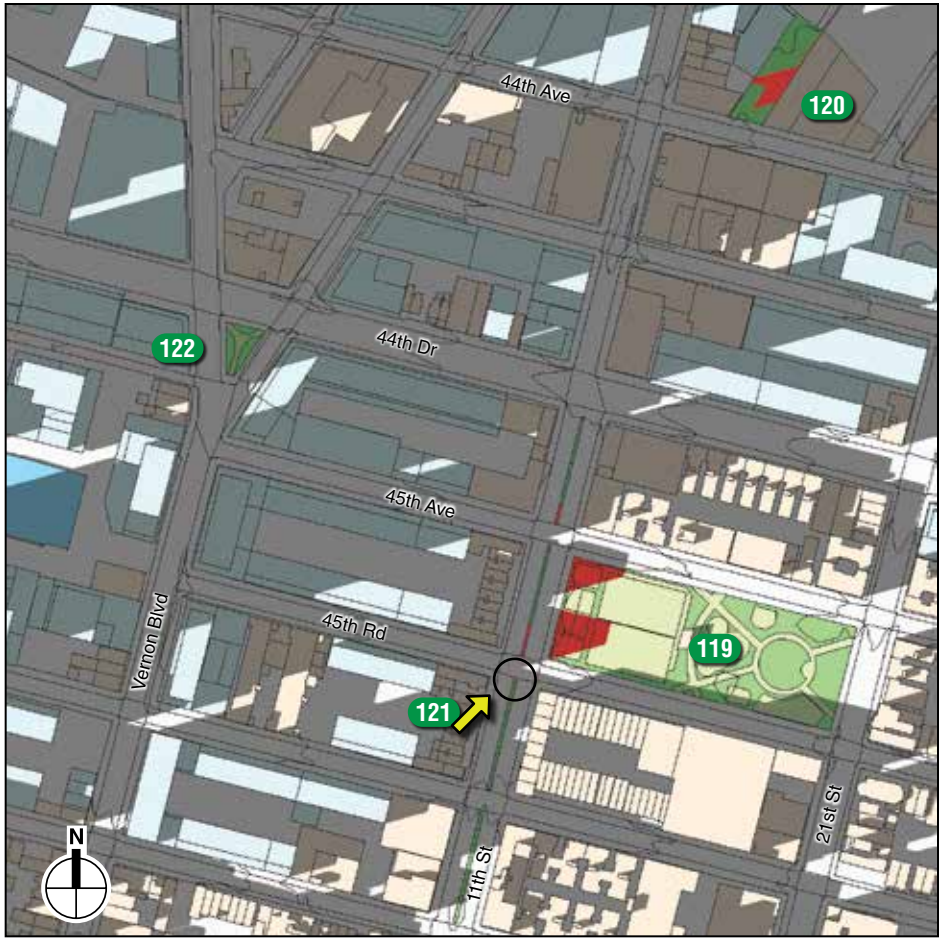
Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

Detailed Analysis
March 21 / September 21

Figure 6-55



4:00 PM EST (5:00 PM EDT)



4:29 PM EST (5:29 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

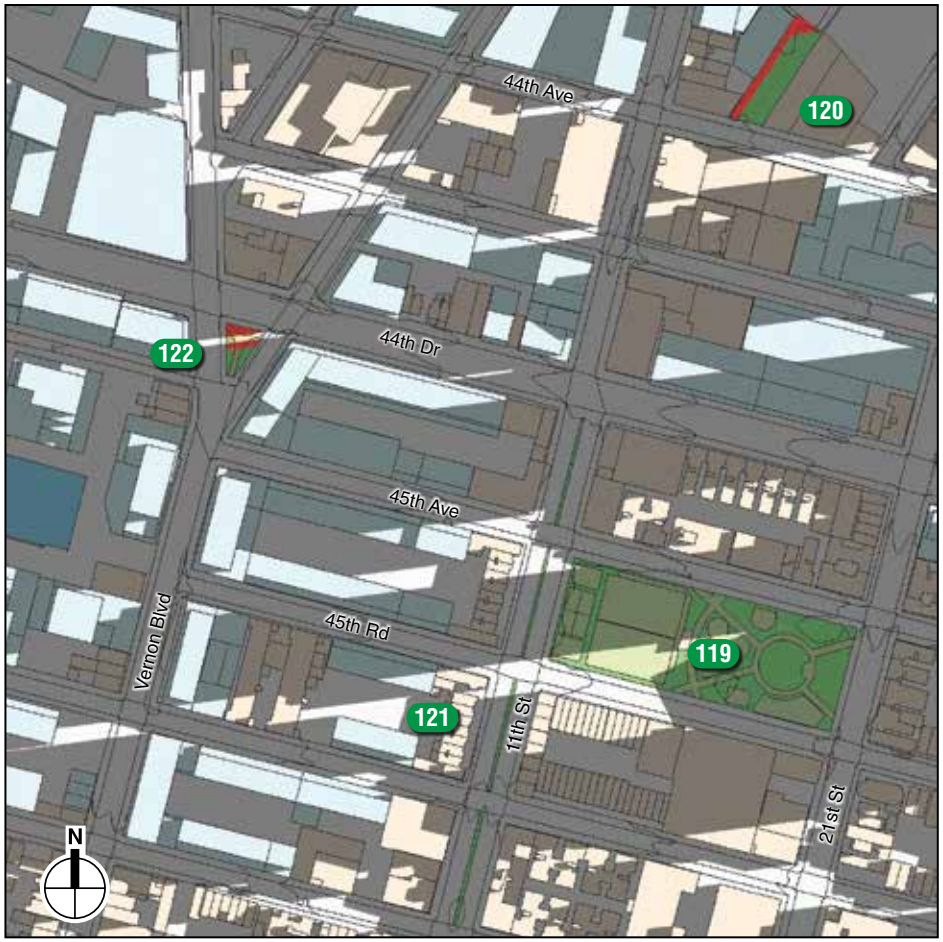
Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

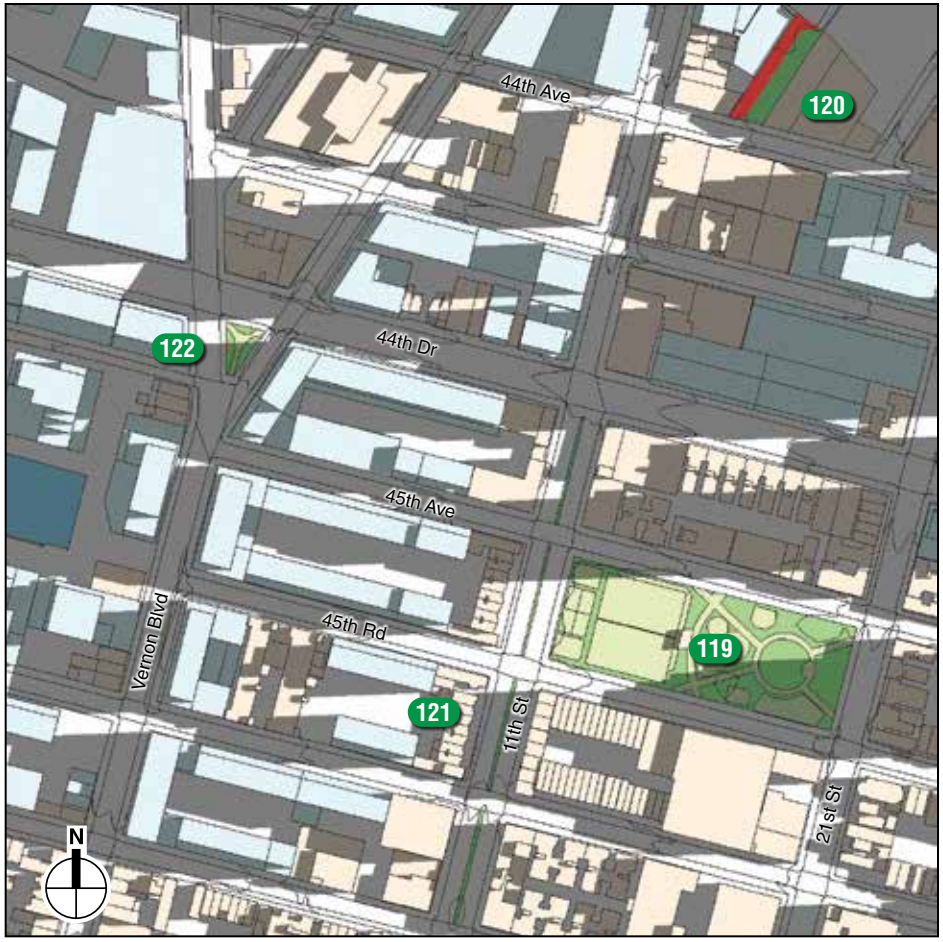
Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

Detailed Analysis
March 21 / September 21

Figure 6-56



6:27 AM EST (7:27 AM EDT)



7:00 AM EST (8:00 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

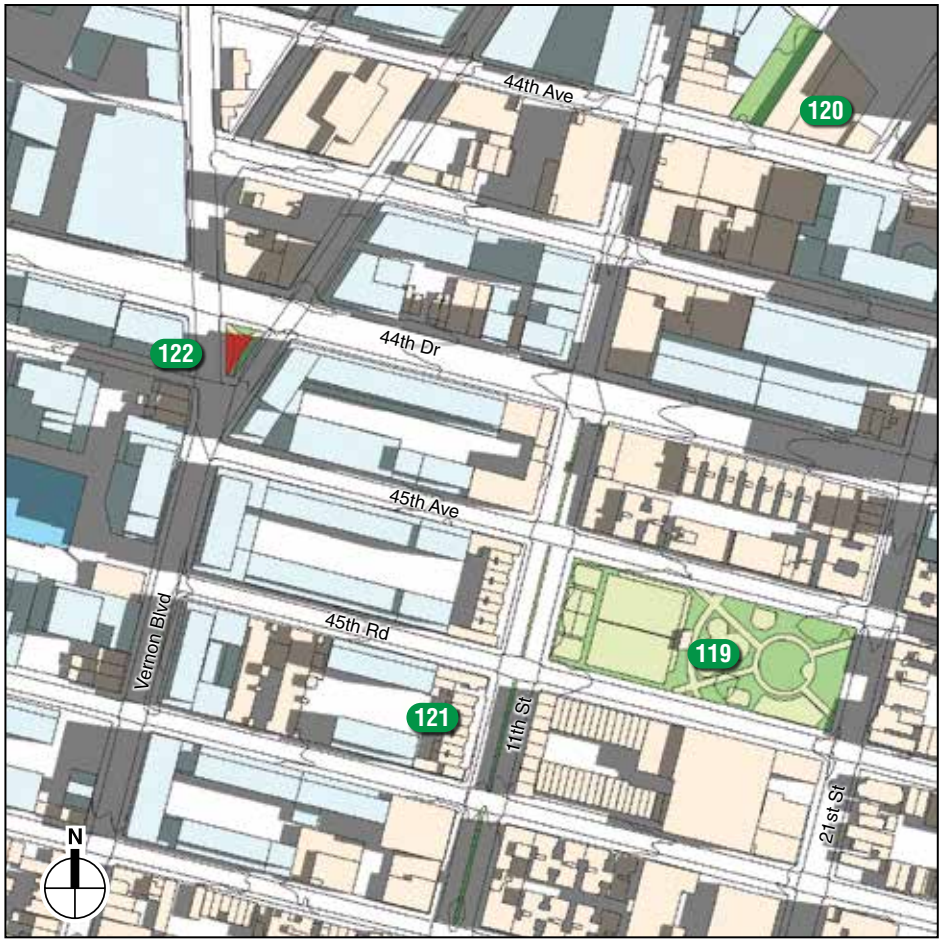
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

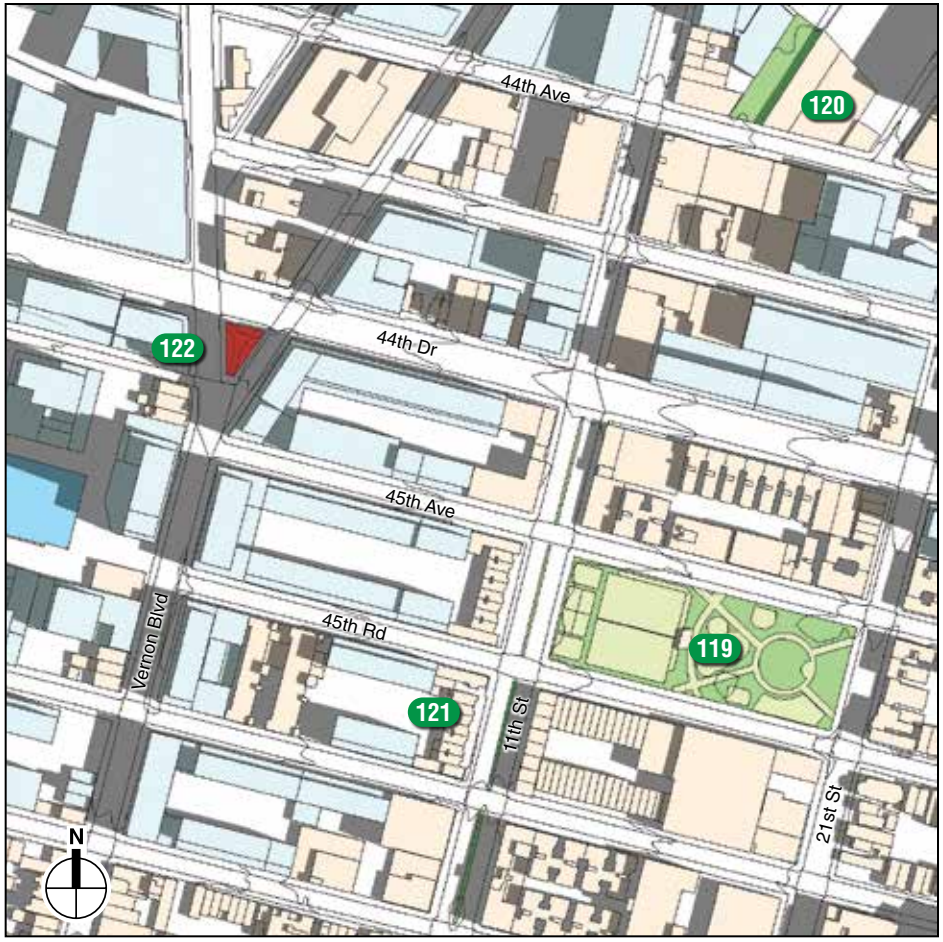
Detailed Analysis
May 6 / August 6

Figure 6-57

2.21.25



8:00 AM EST (9:00 AM EDT)



9:00 AM EST (10:00 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

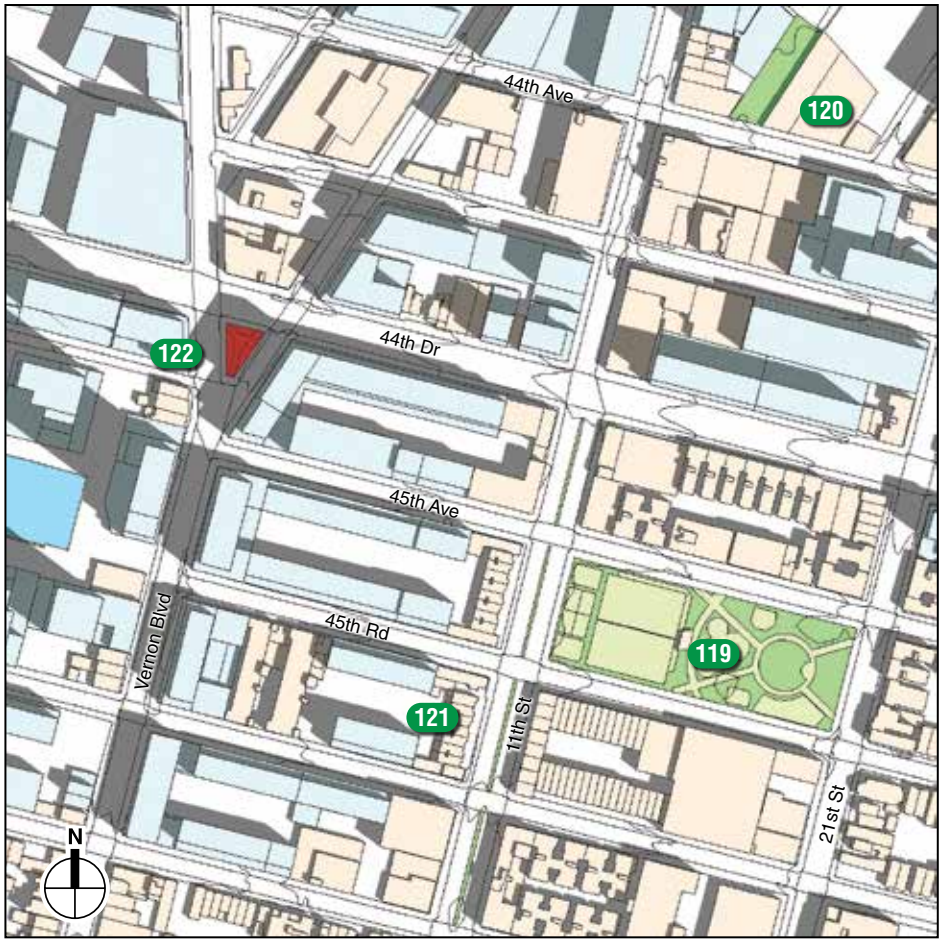
Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

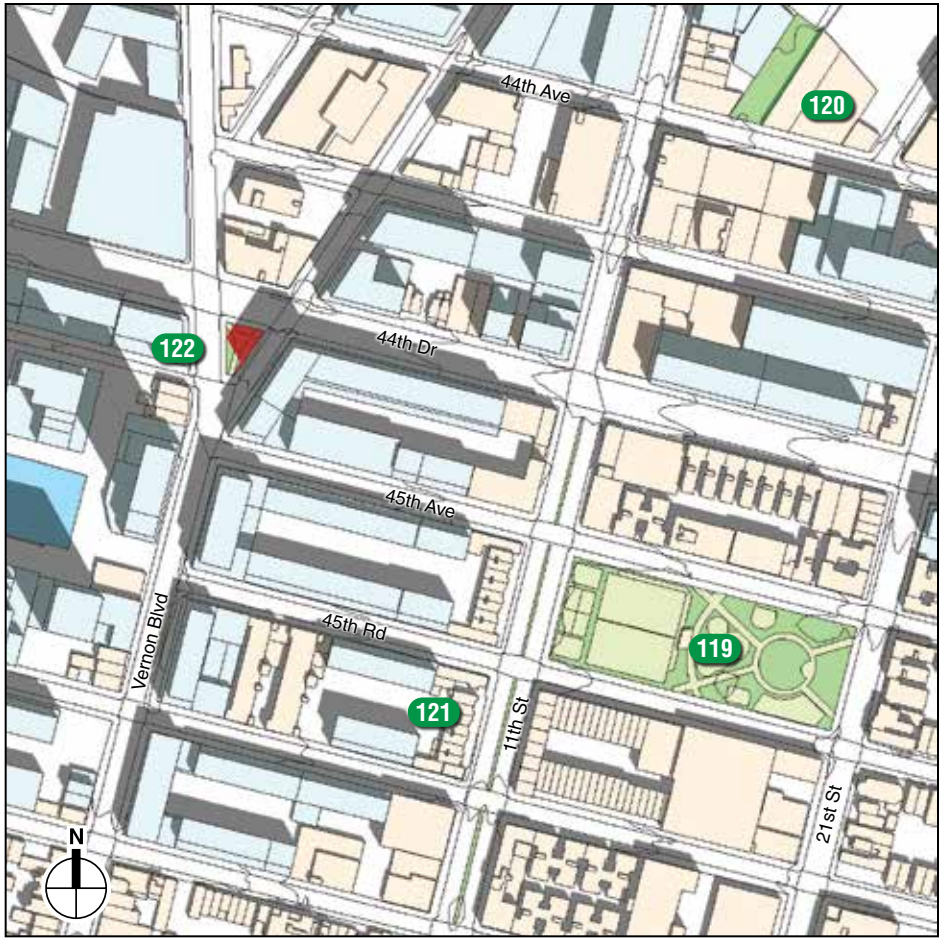
Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

Detailed Analysis
May 6 / August 6

Figure 6-58



10:00 AM EST (11:00 AM EDT)



11:00 AM EST (12:00 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

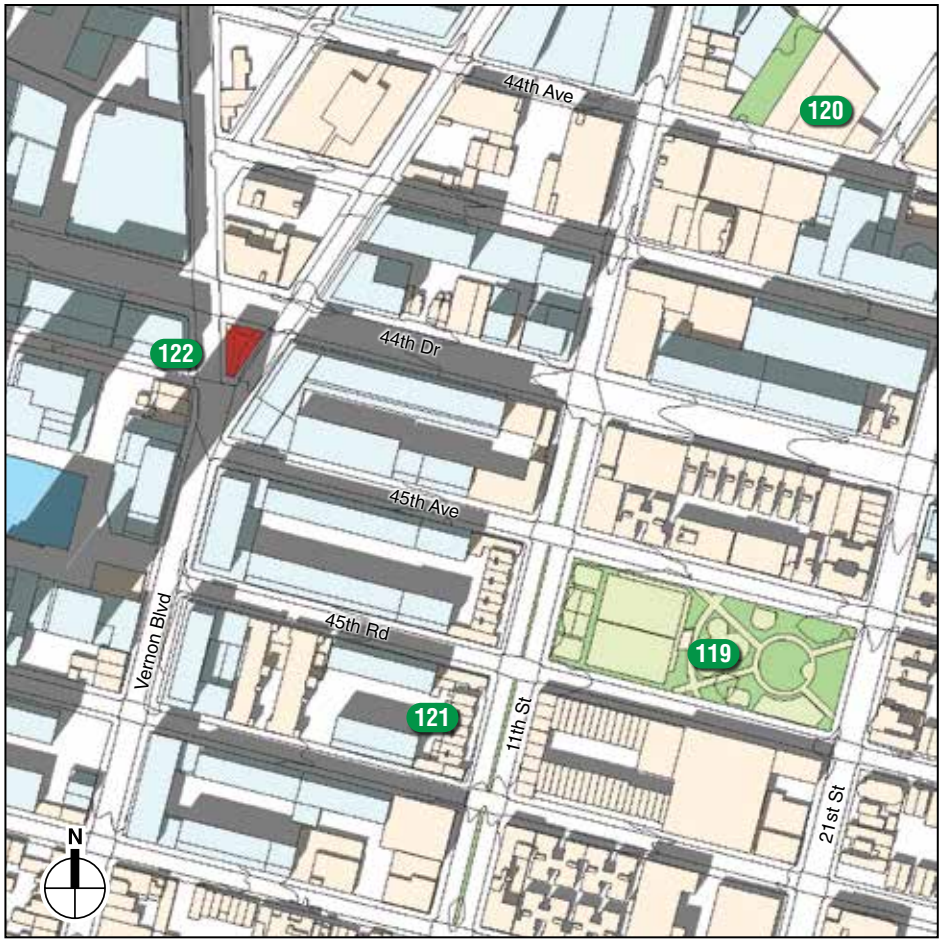
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

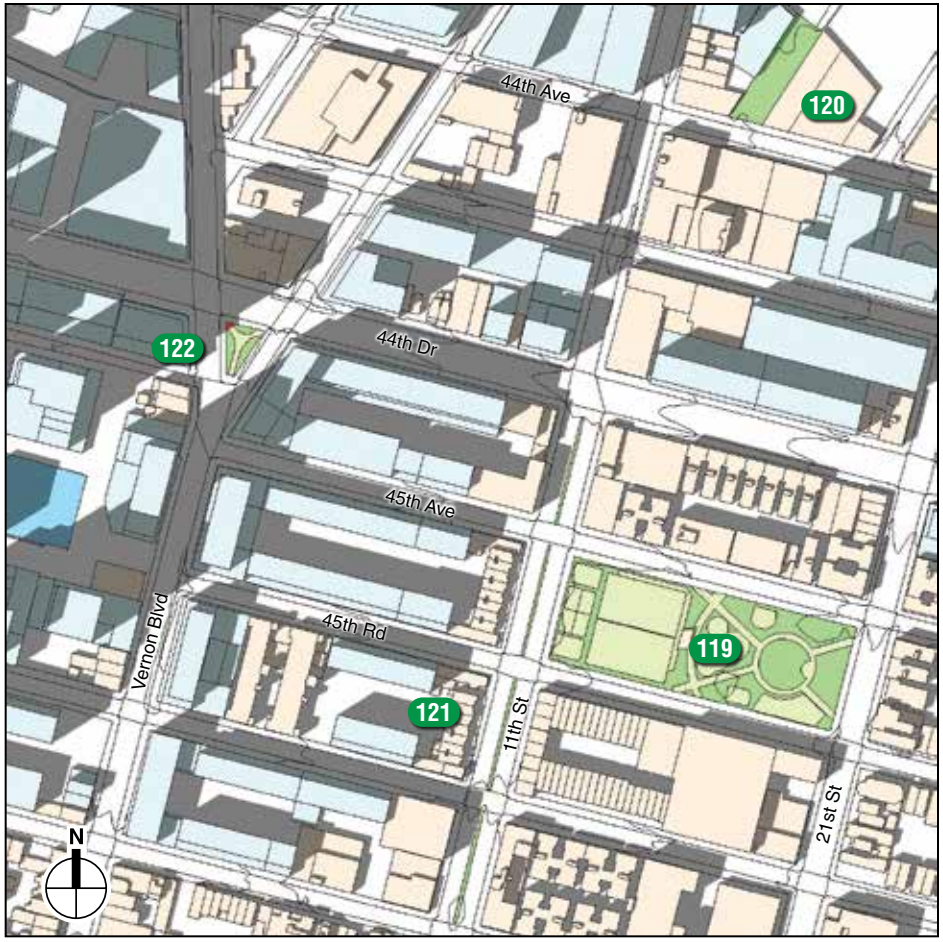
Detailed Analysis
May 6 / August 6

Figure 6-59

2.21.25



1:00 PM EST (2:00 PM EDT)



2:00 PM EST (3:00 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

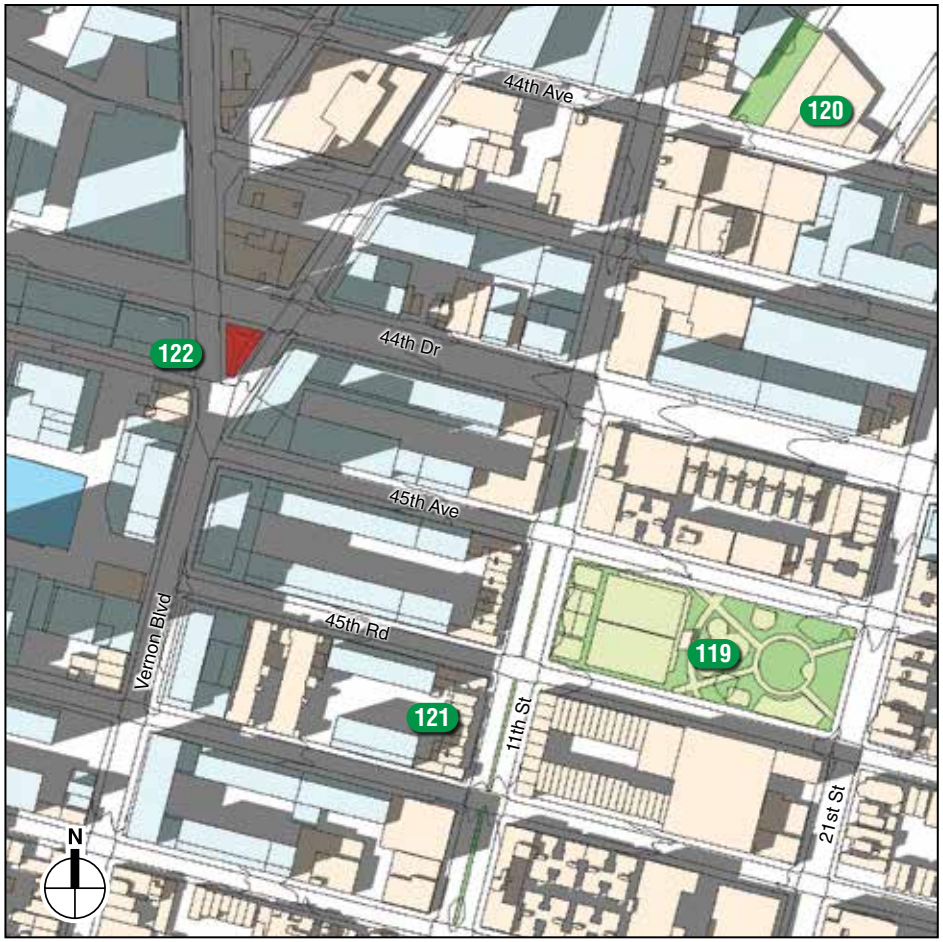
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

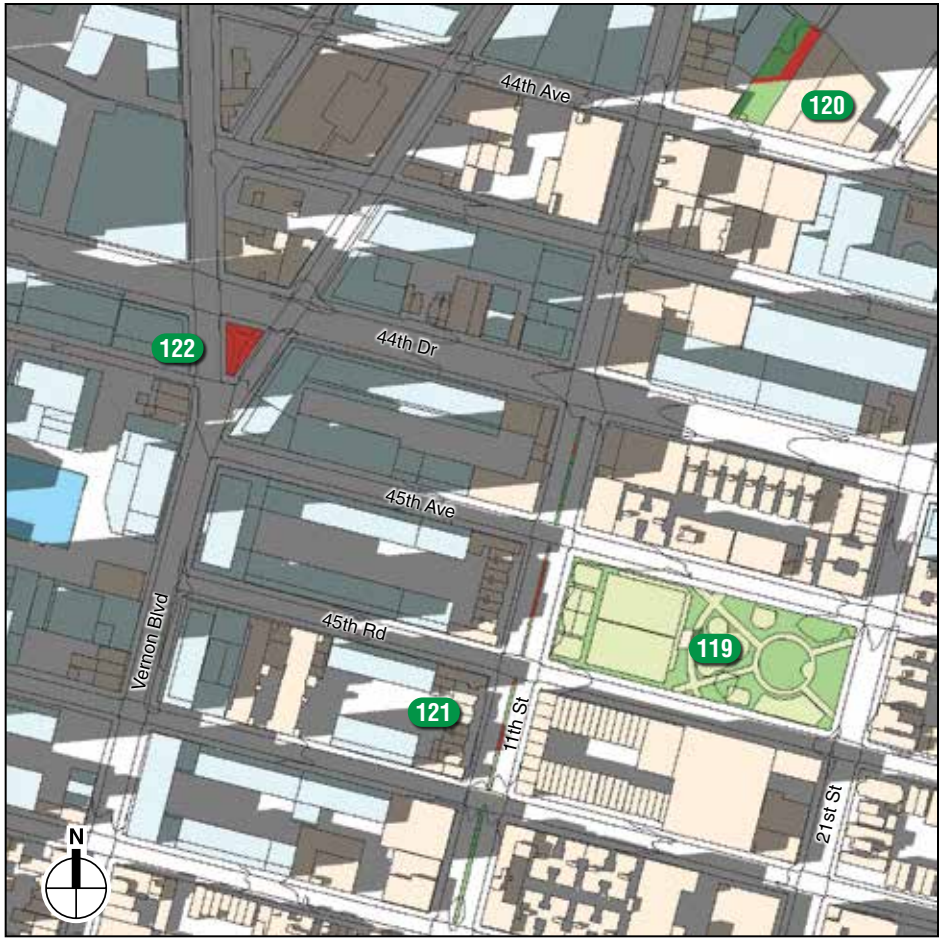
Detailed Analysis
May 6 / August 6

LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-60



3:00 PM EST (4:00 PM EDT)



4:00 PM EST (5:00 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

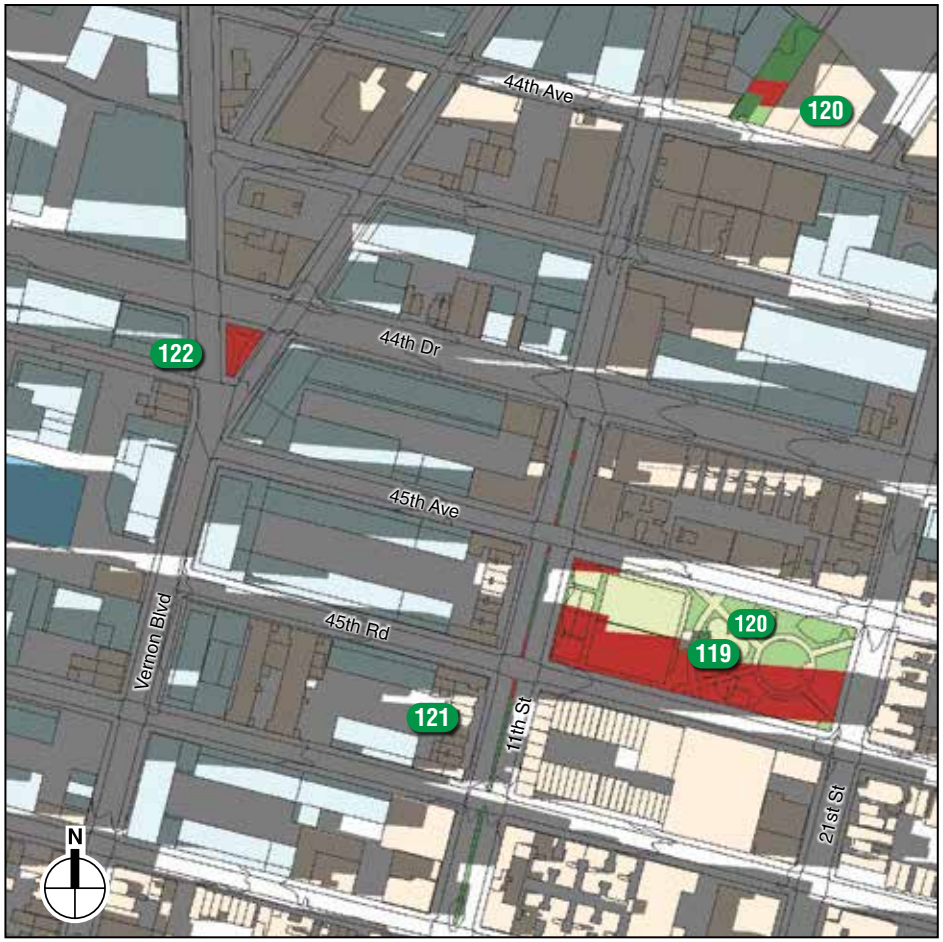
Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

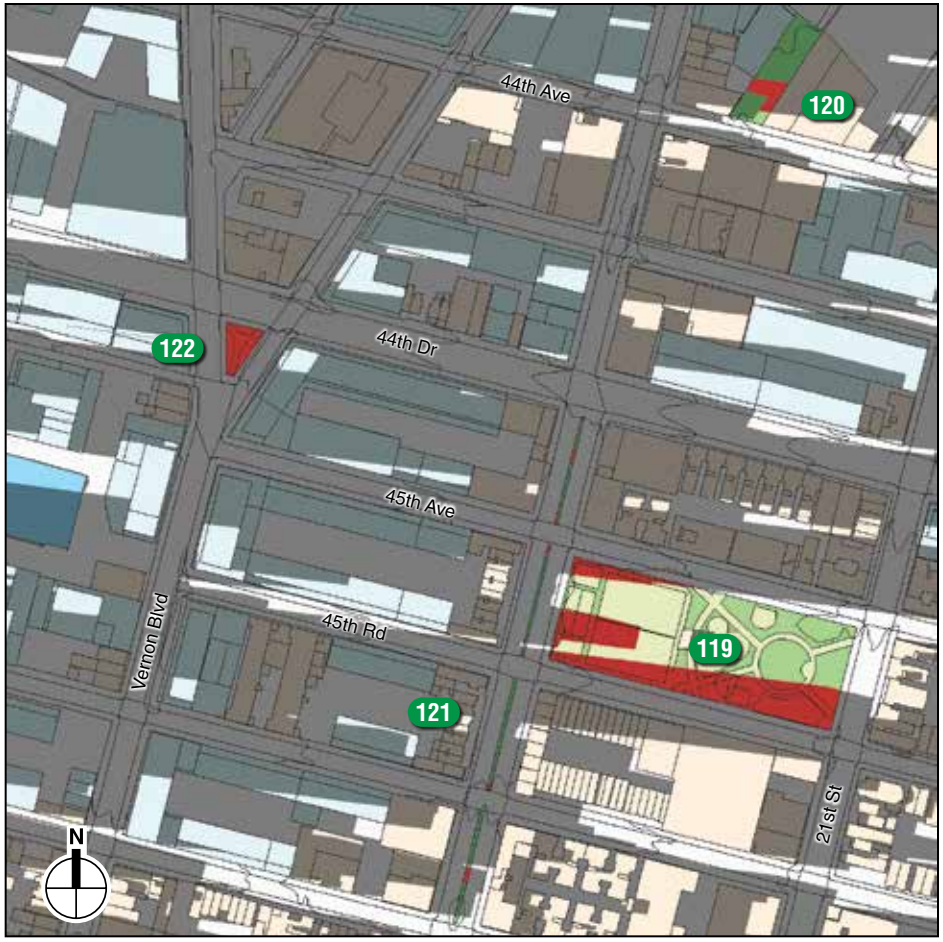
Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

Detailed Analysis
May 6 / August 6

Figure 6-61



5:00 PM EST (6:00 PM EDT)



5:18 PM EST (6:18 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

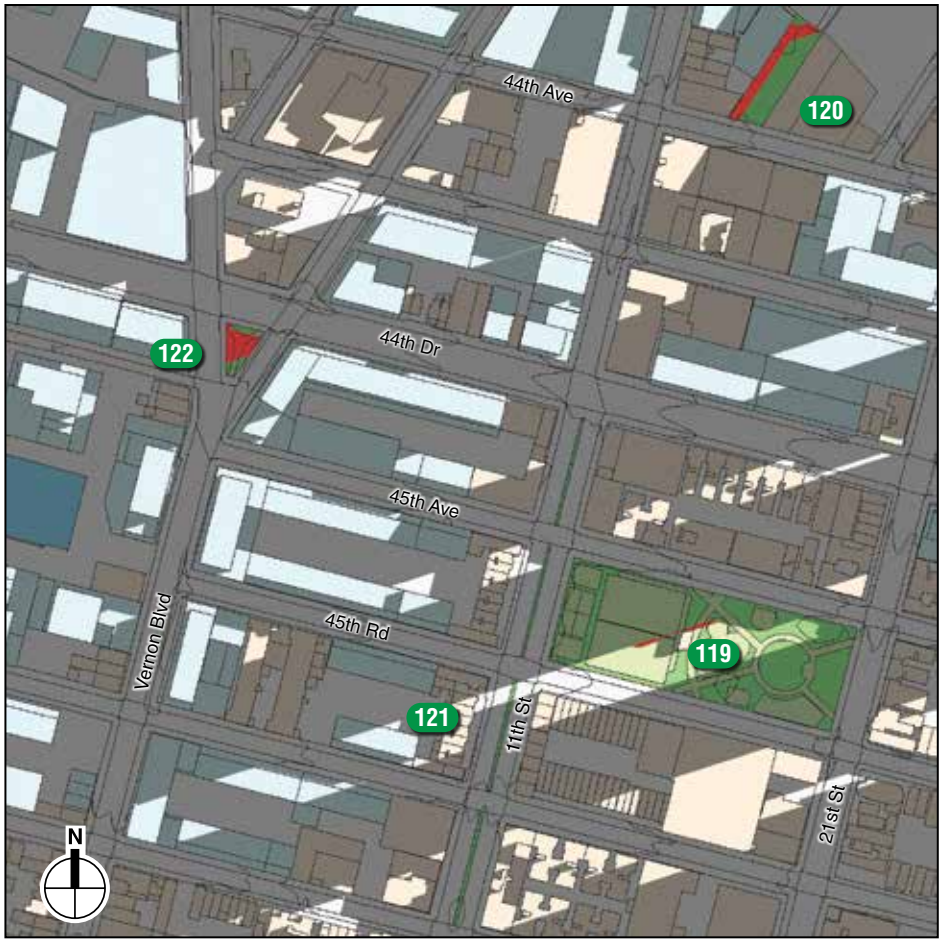
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

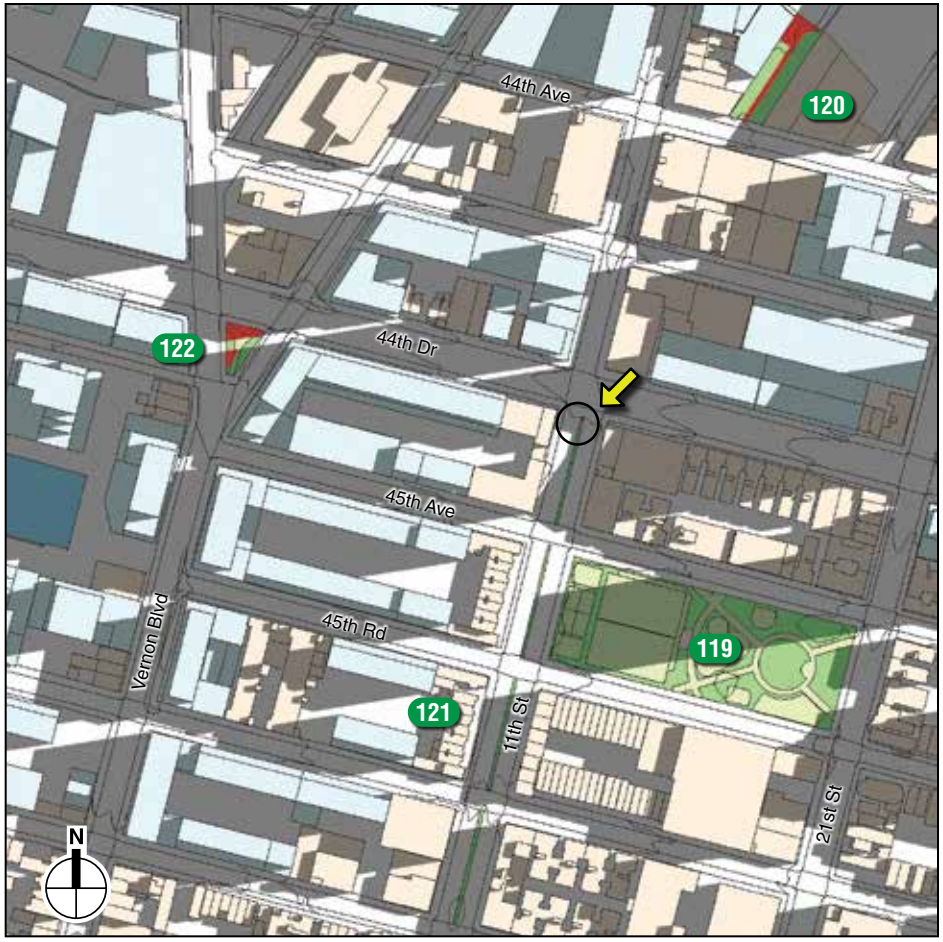
Detailed Analysis
May 6 / August 6

LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-62



6:00 AM EST (7:00 AM EDT)



7:00 AM EST (8:00 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

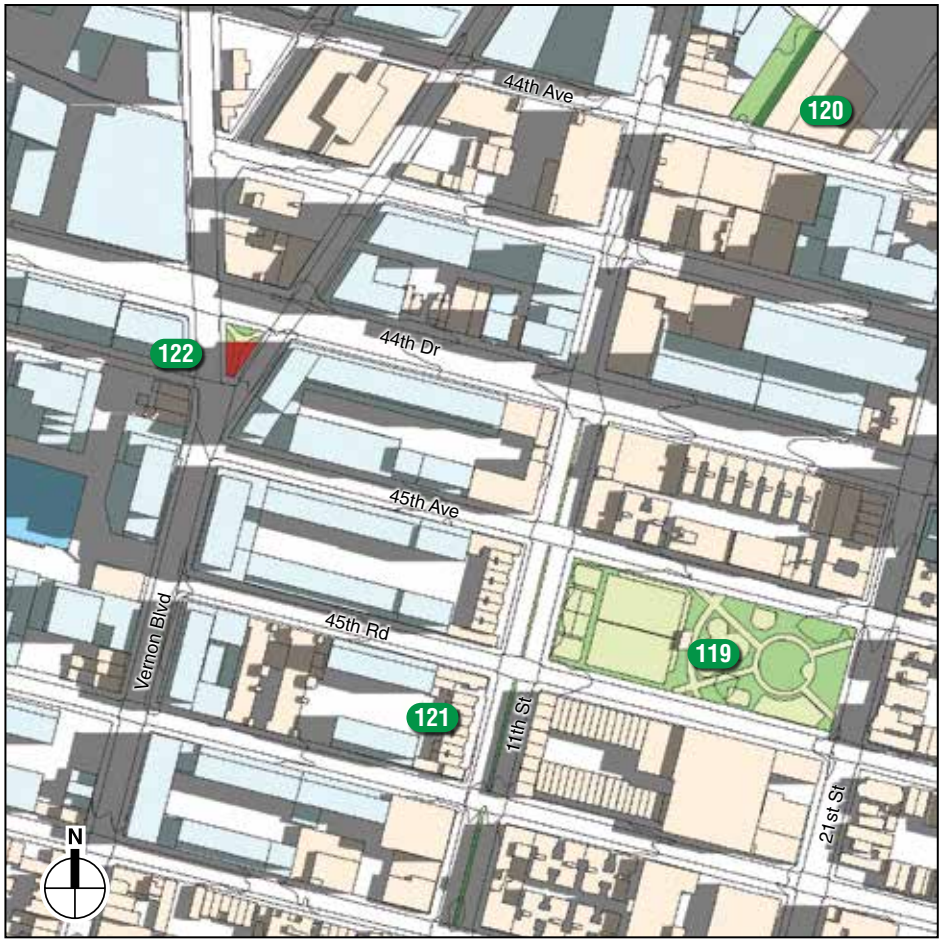
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

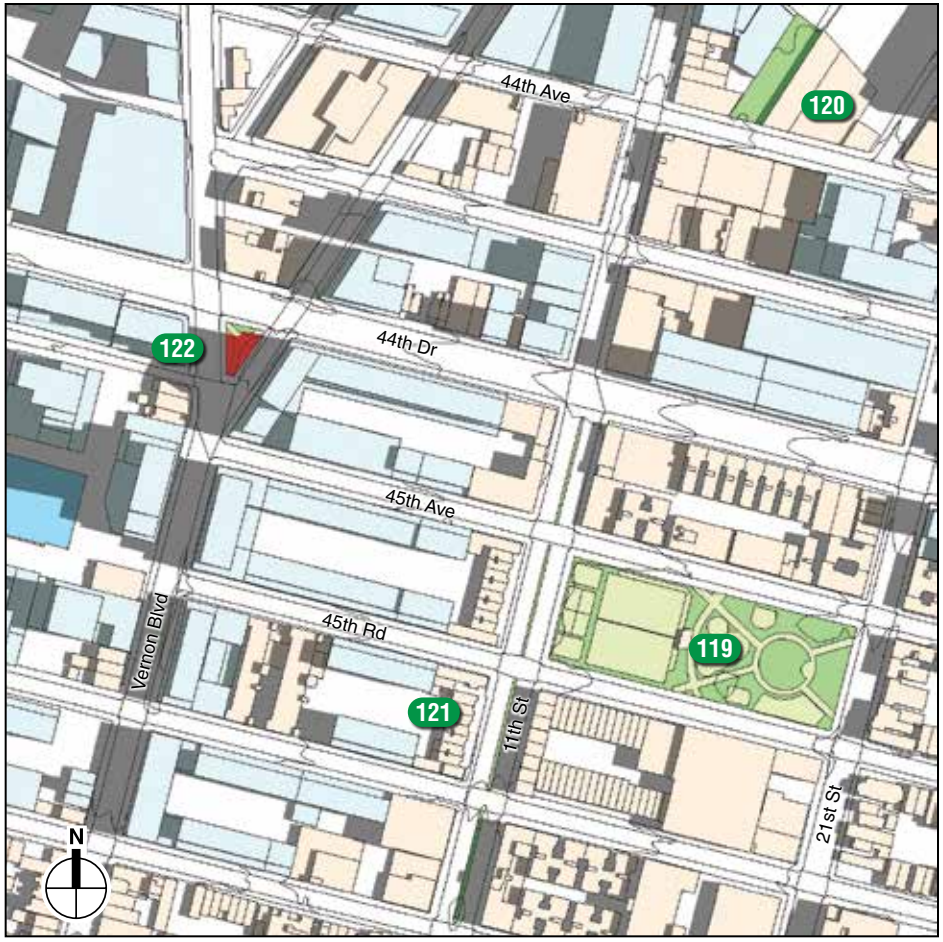
Detailed Analysis
June 21

LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-63



8:00 AM EST (9:00 AM EDT)



9:00 AM EST (10:00 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

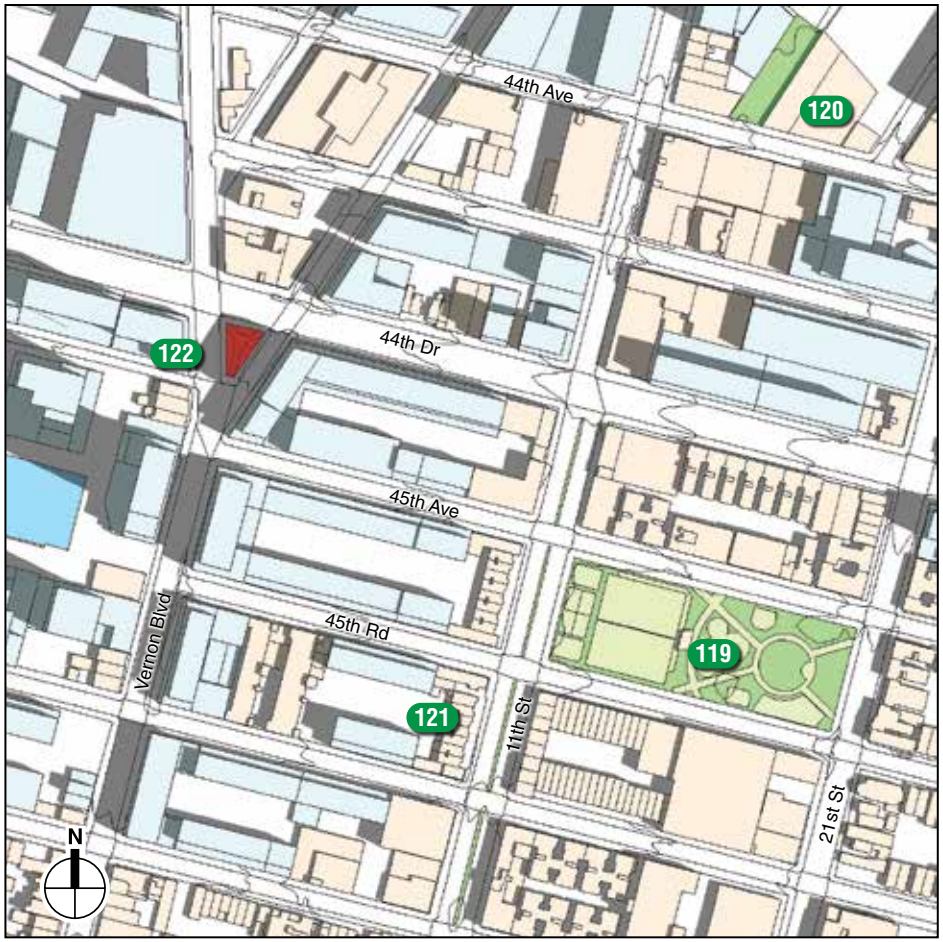
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

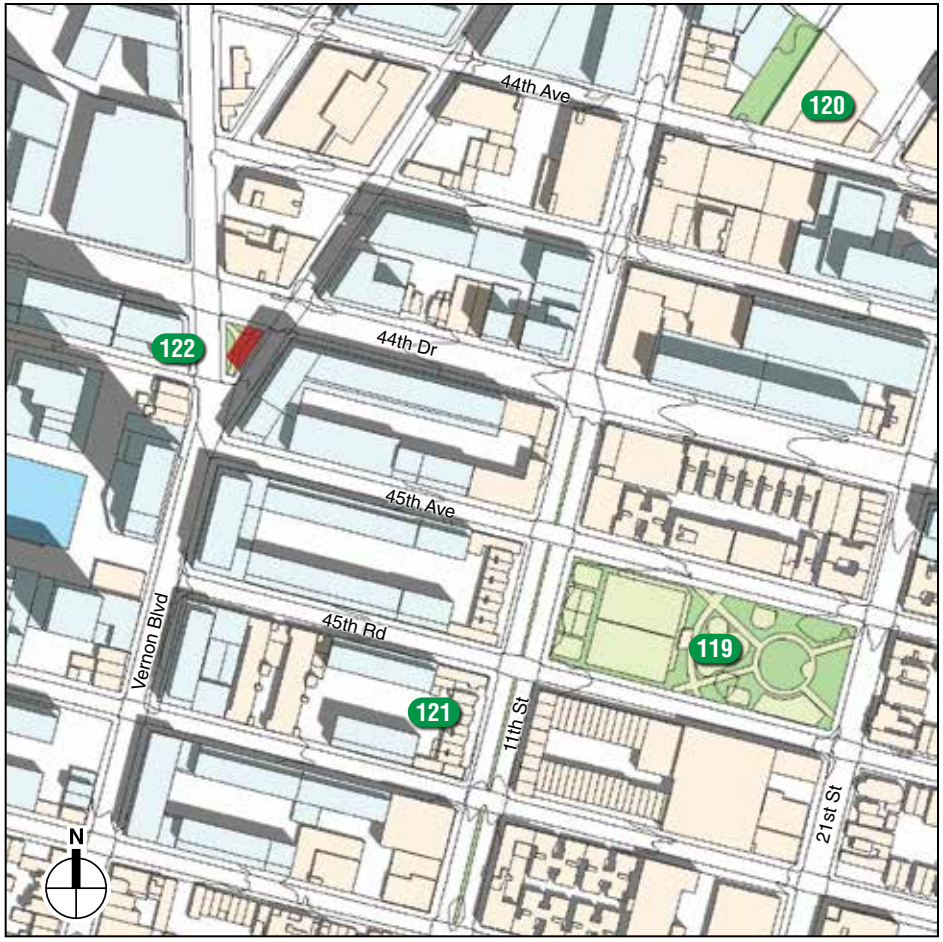
Detailed Analysis
June 21

Figure 6-64

2.21.25



10:00 AM EST (11:00 AM EDT)



11:00 AM EST (12:00 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

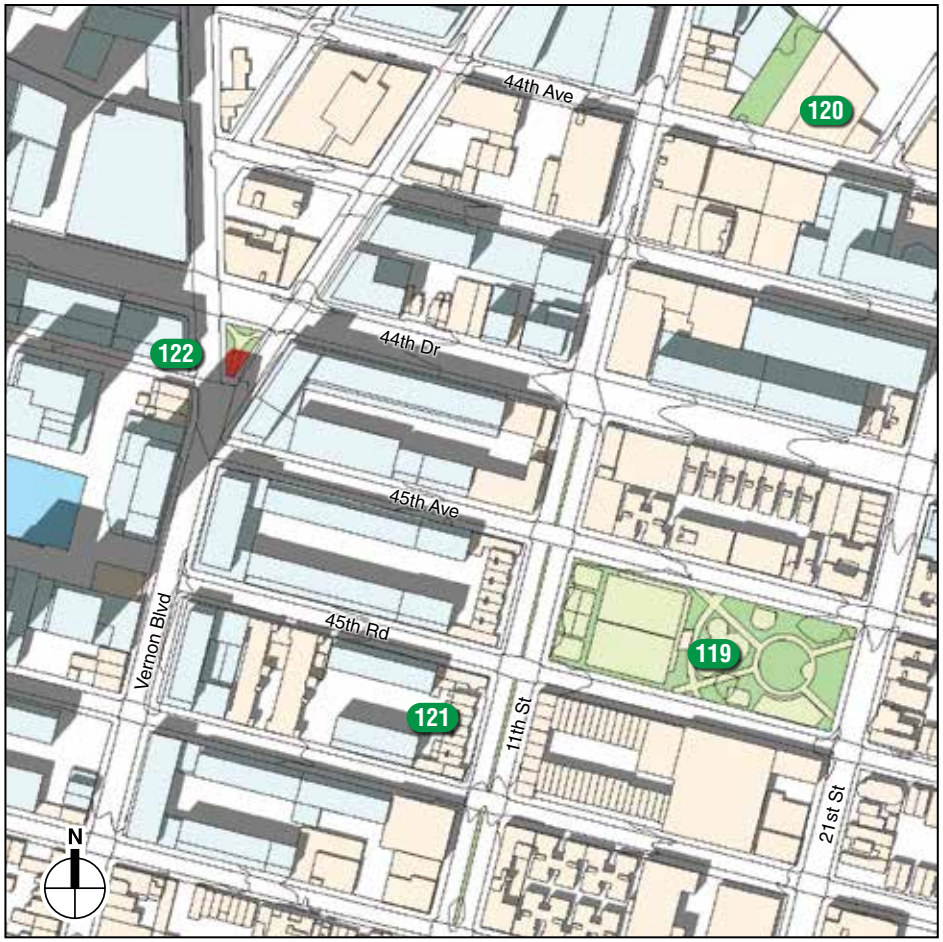
Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

Detailed Analysis
June 21

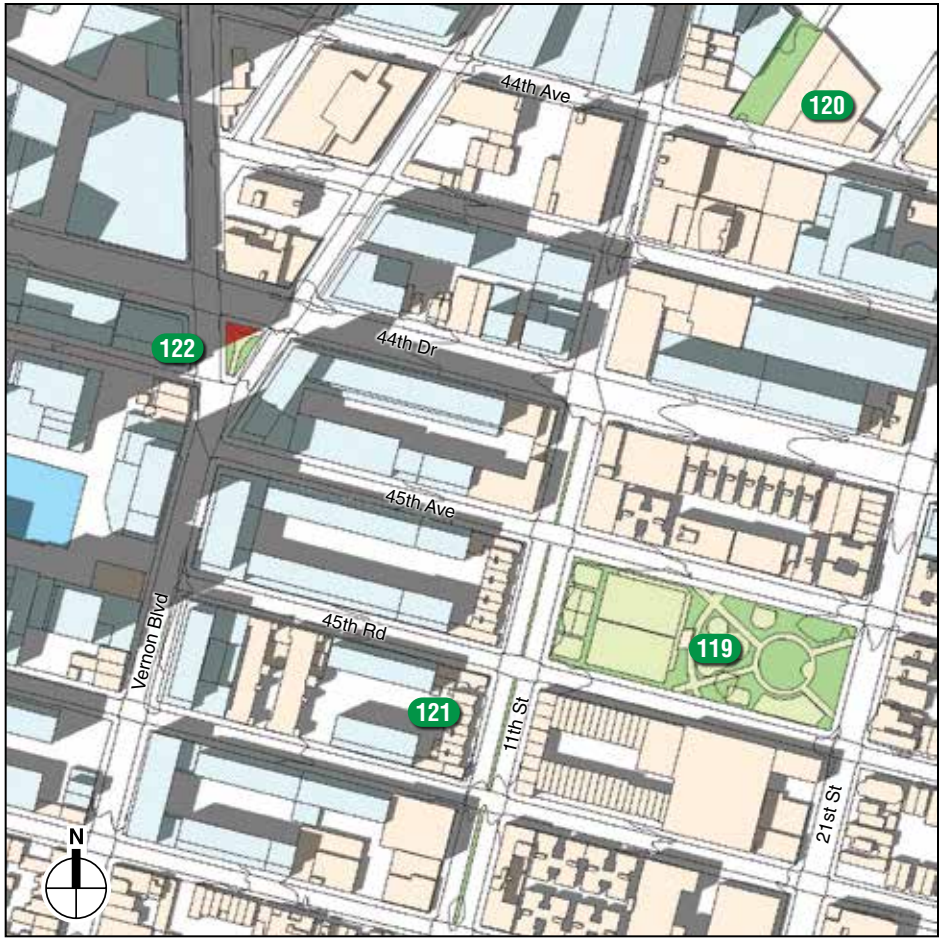
LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-65

2.21.25



1:00 PM EST (2:00 PM EDT)



2:00 PM EST (3:00 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

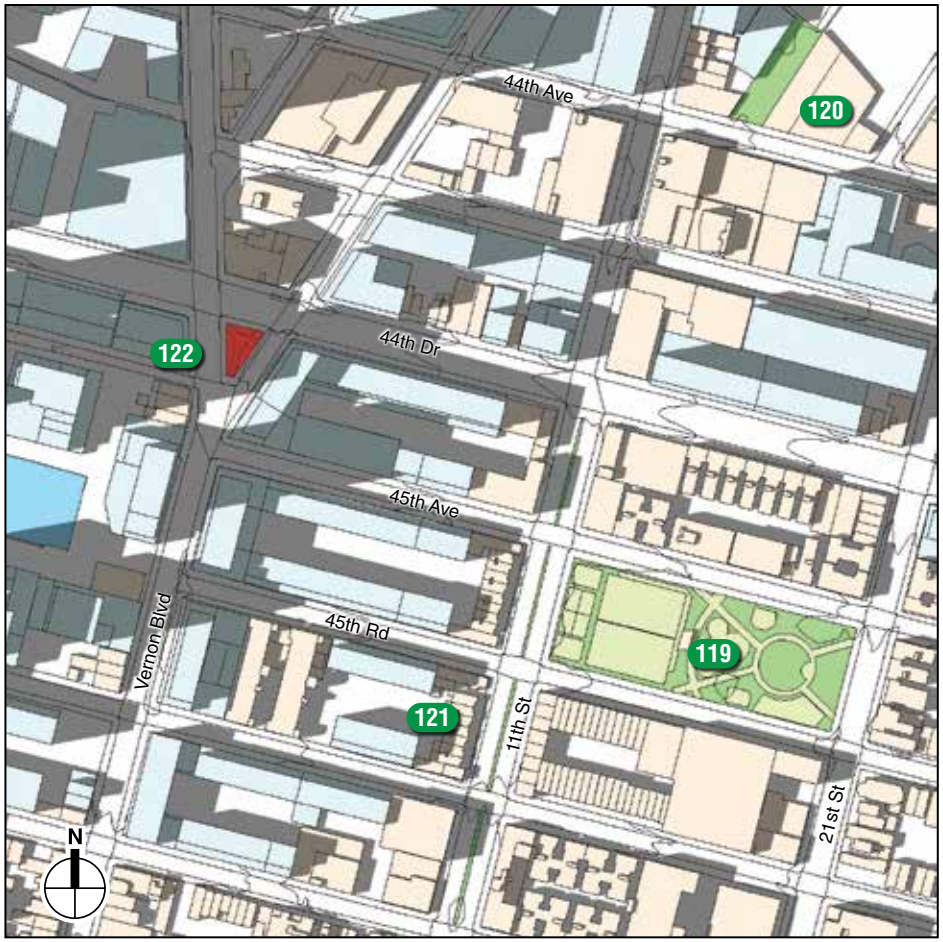
Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

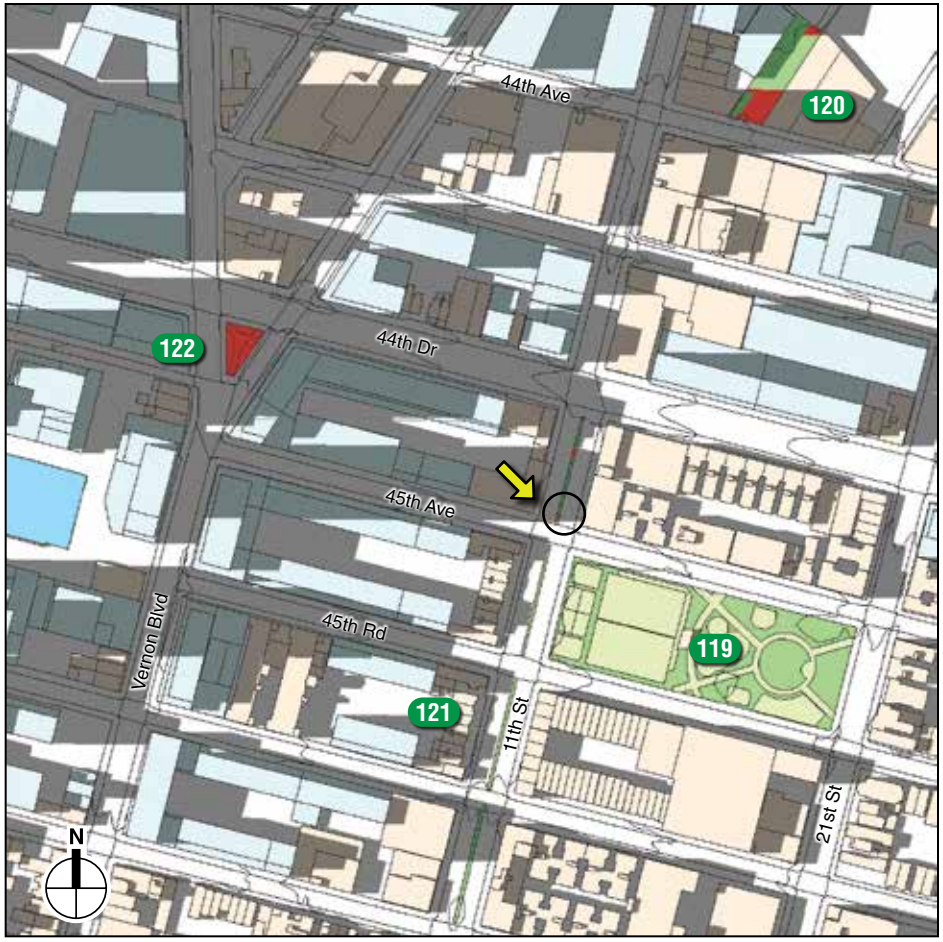
Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

Detailed Analysis
June 21

Figure 6-66



3:00 PM EST (4:00 PM EDT)



4:00 PM EST (5:00 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

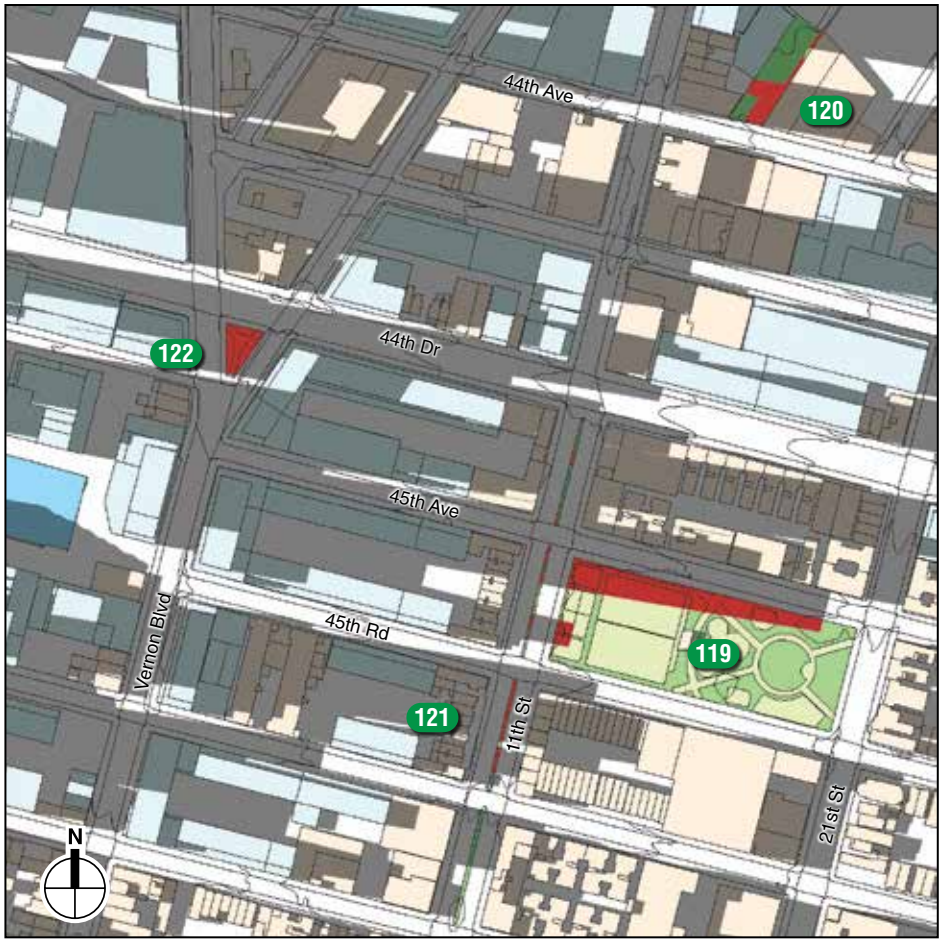
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

Detailed Analysis
June 21

LONG ISLAND CITY NEIGHBORHOOD PLAN

Figure 6-67



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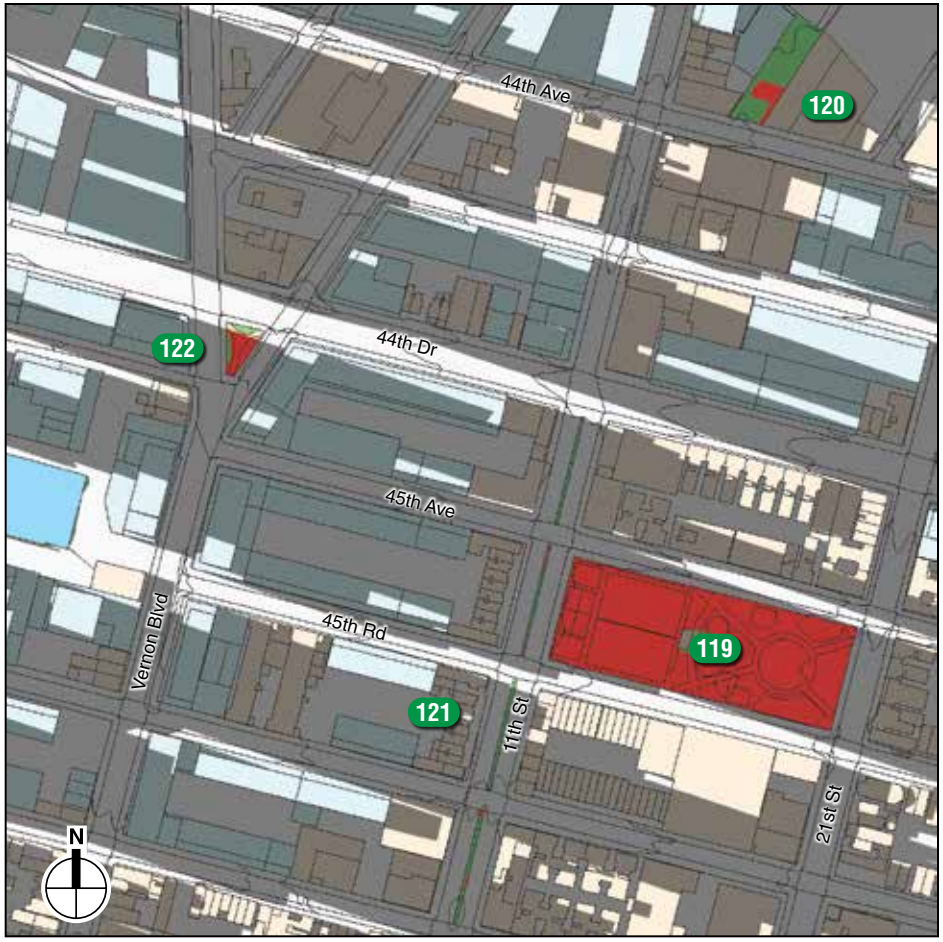


6:00 PM EST (7:00 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

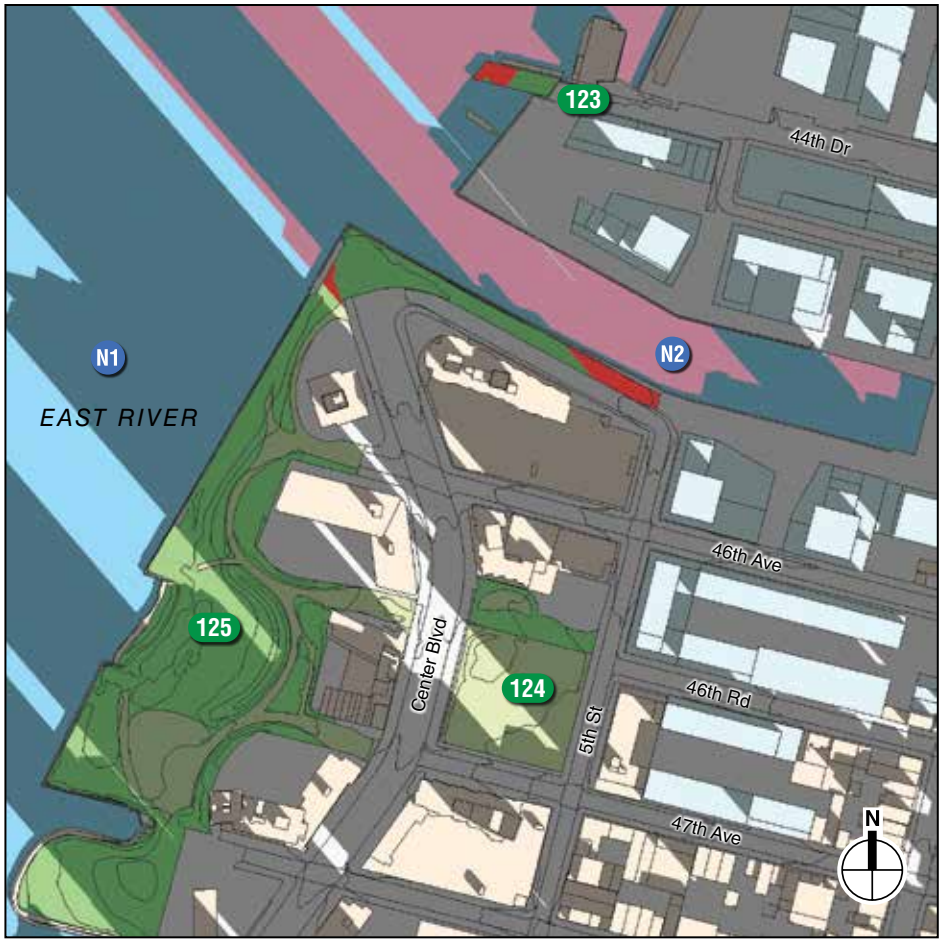
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

Murray Playground (#119),
12th Street Plaza (#120),
11th Street Greenstreets (#121),
and Gordon Triangle (#122)

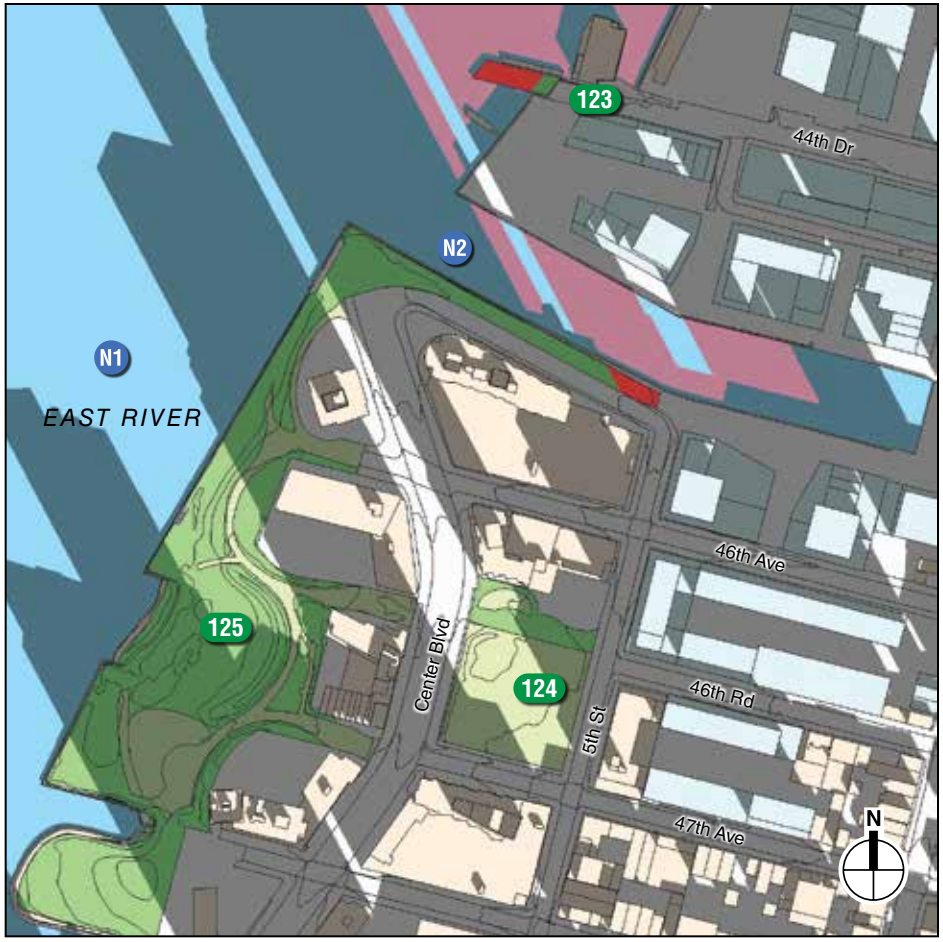
Detailed Analysis
June 21

Figure 6-68

2.21.25



9:00 AM



10:00 AM

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

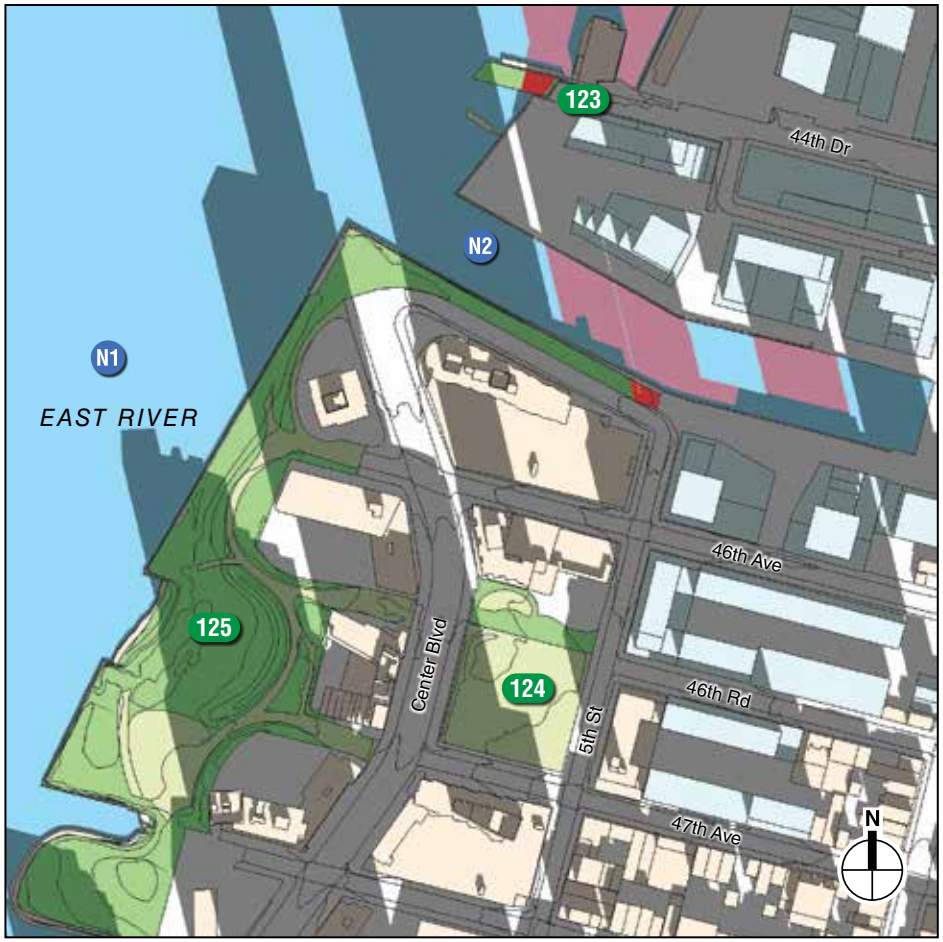
NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.

44th Drive Pier (#123),
Queens West Sports Field (#124), and
Gantry Plaza State Park (#125)

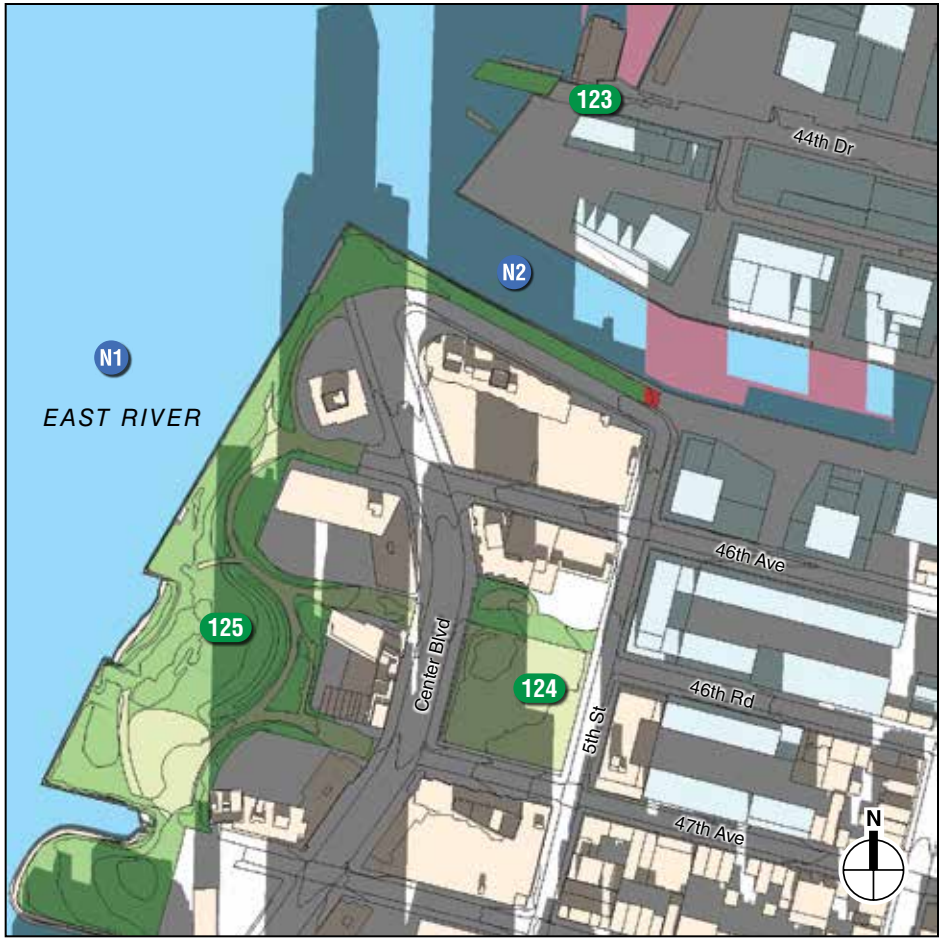
Detailed Analysis
December 21

Figure 6-69

2.21.25



11:00 AM



12:00 PM

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

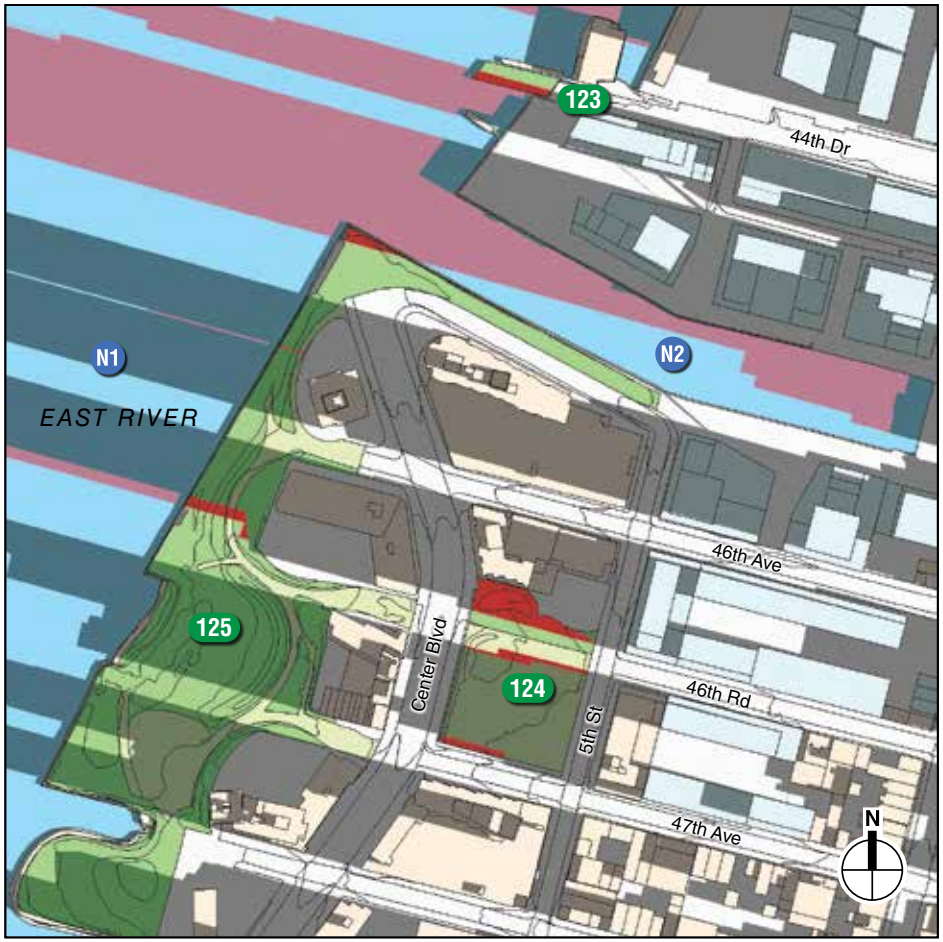
NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.

44th Drive Pier (#123),
Queens West Sports Field (#124), and
Gantry Plaza State Park (#125)

Detailed Analysis
December 21

Figure 6-70

2.21.25



7:36 AM EST (8:36 AM EDT)



8:00 AM EST (9:00 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

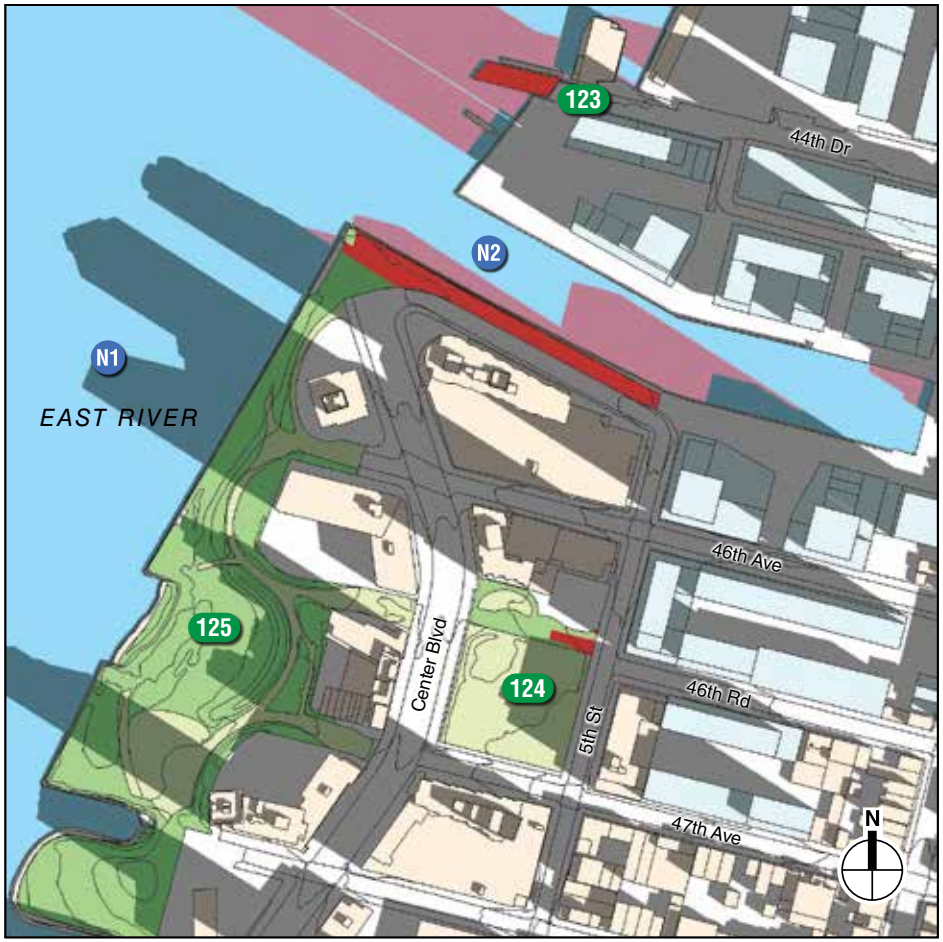
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

44th Drive Pier (#123),
Queens West Sports Field (#124), and
Gantry Plaza State Park (#125)

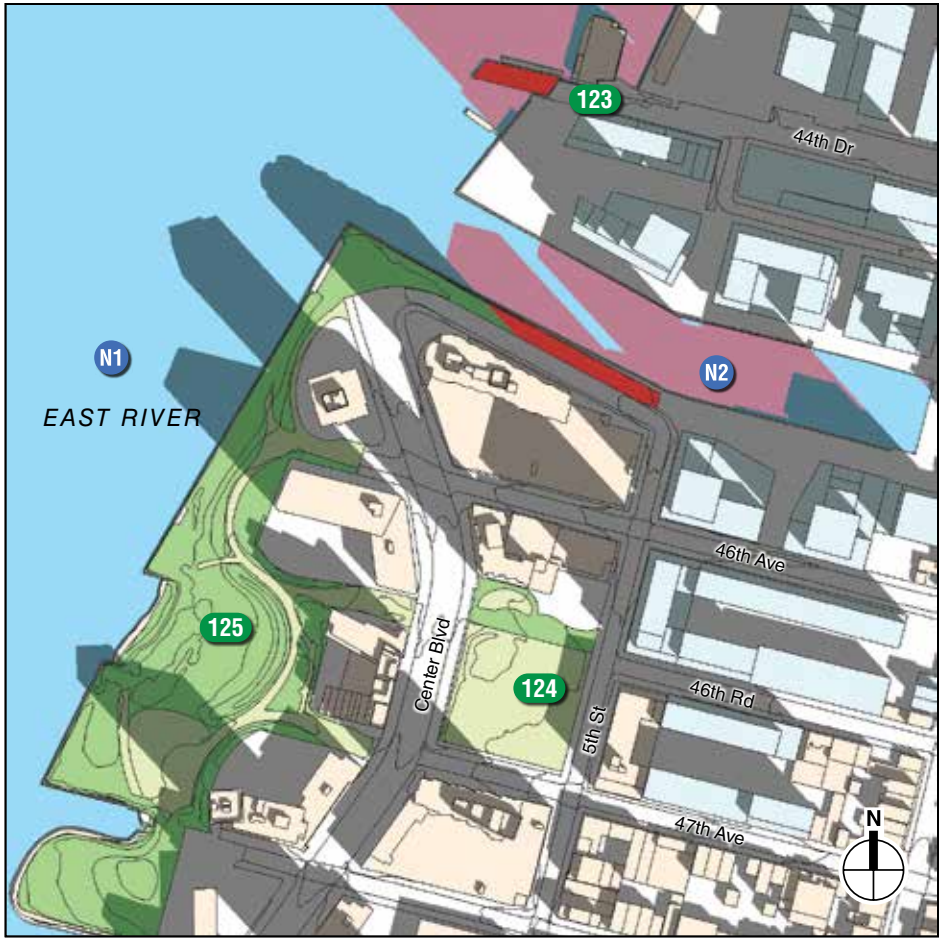
Detailed Analysis
March 21 / September 21

Figure 6-71

2.21.25



9:00 AM EST (10:00 AM EDT)



10:00 AM EST (11:00 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

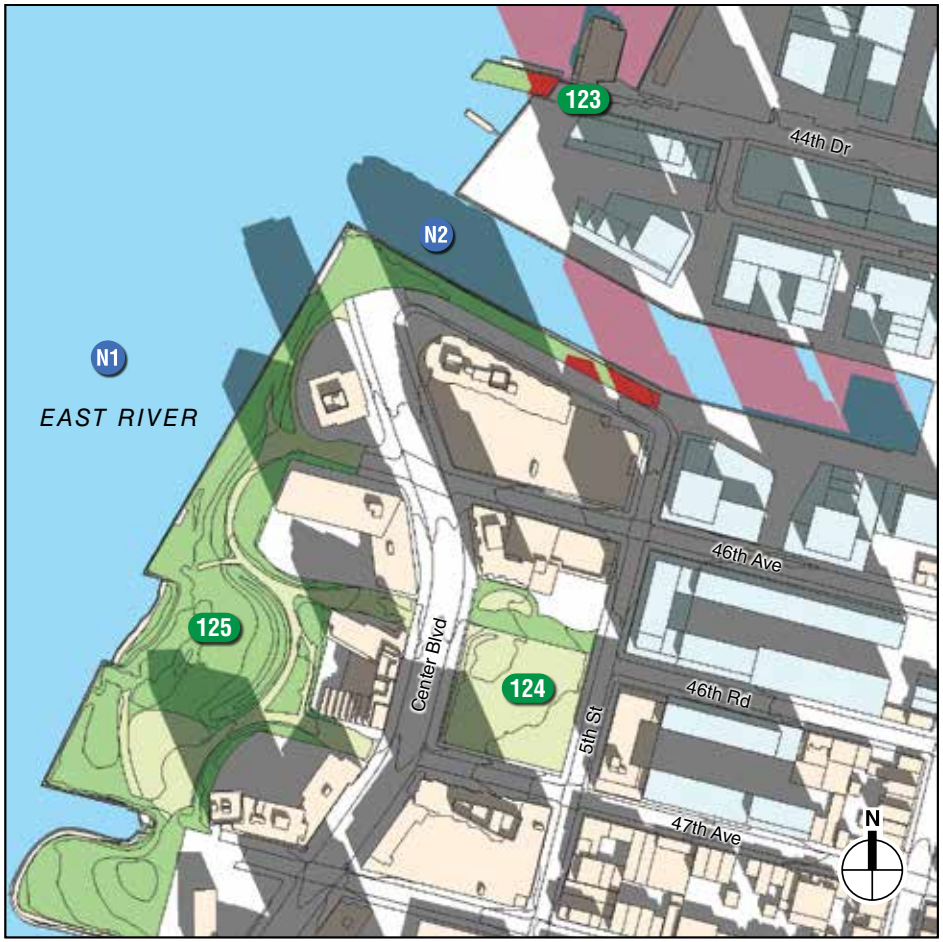
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

44th Drive Pier (#123),
Queens West Sports Field (#124), and
Gantry Plaza State Park (#125)

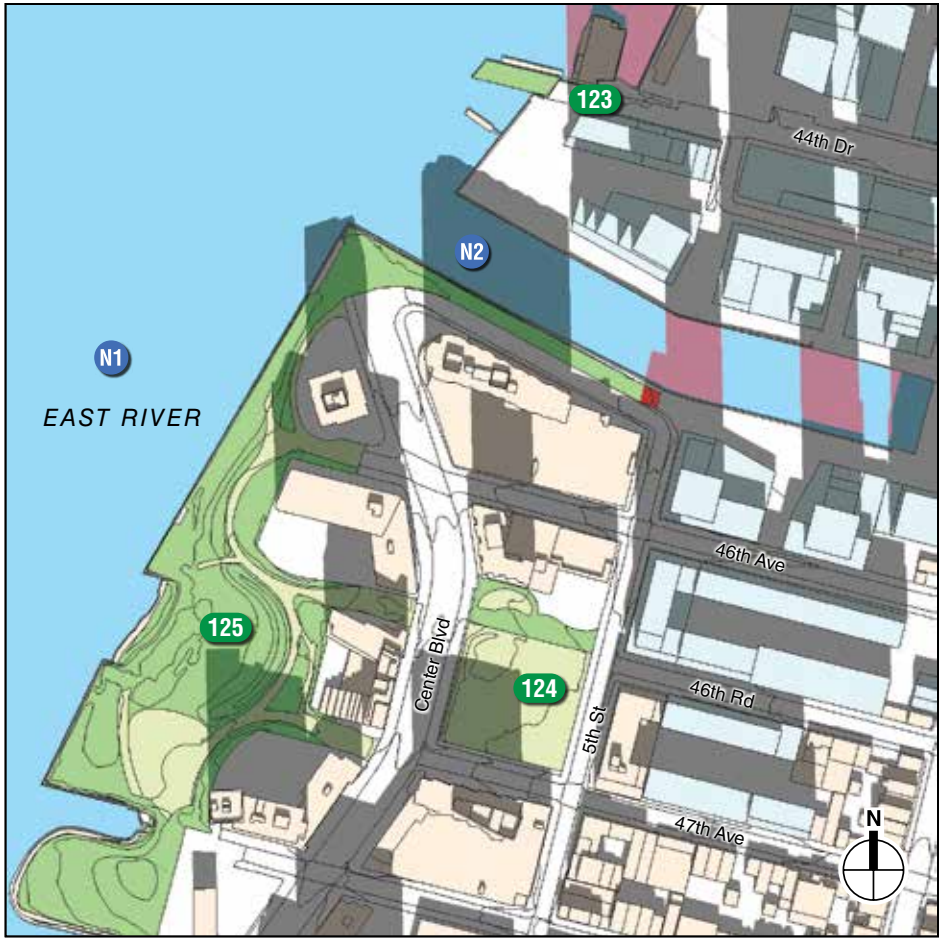
Detailed Analysis
March 21 / September 21

Figure 6-72

2.21.25



11:00 AM EST (12:00 PM EDT)



12:00 PM EST (1:00 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

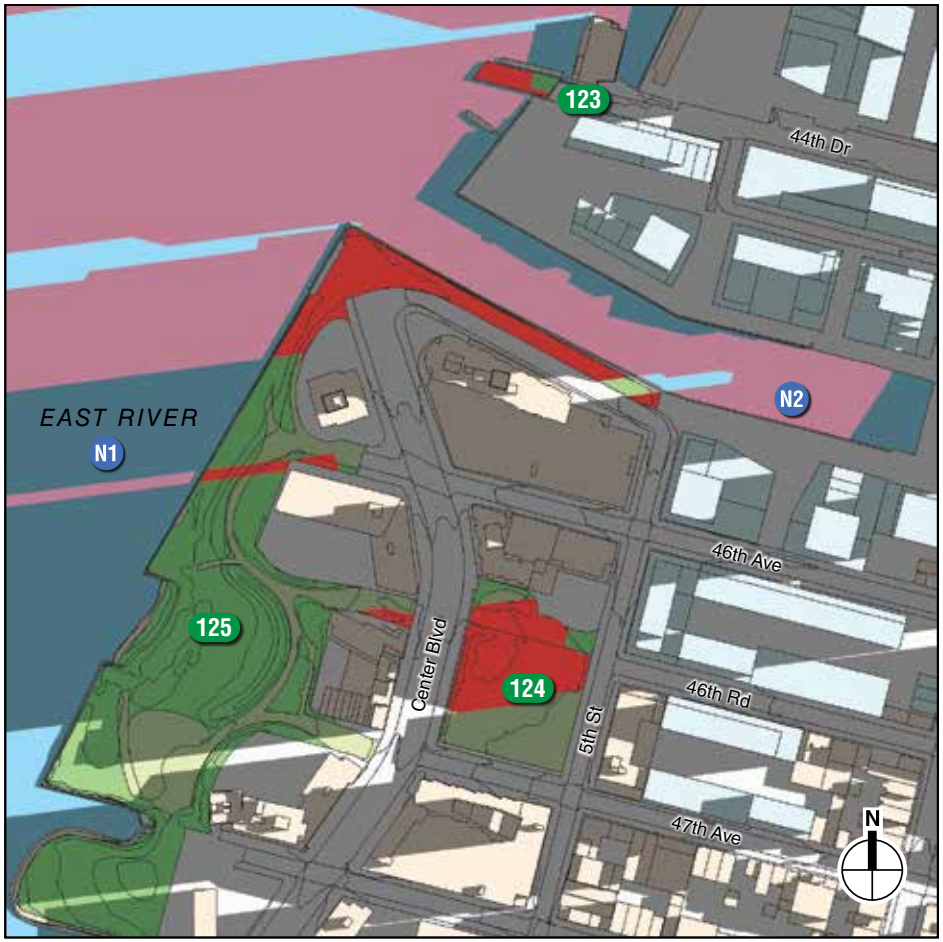
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

44th Drive Pier (#123),
Queens West Sports Field (#124), and
Gantry Plaza State Park (#125)

Detailed Analysis
March 21 / September 21

Figure 6-73

2.21.25



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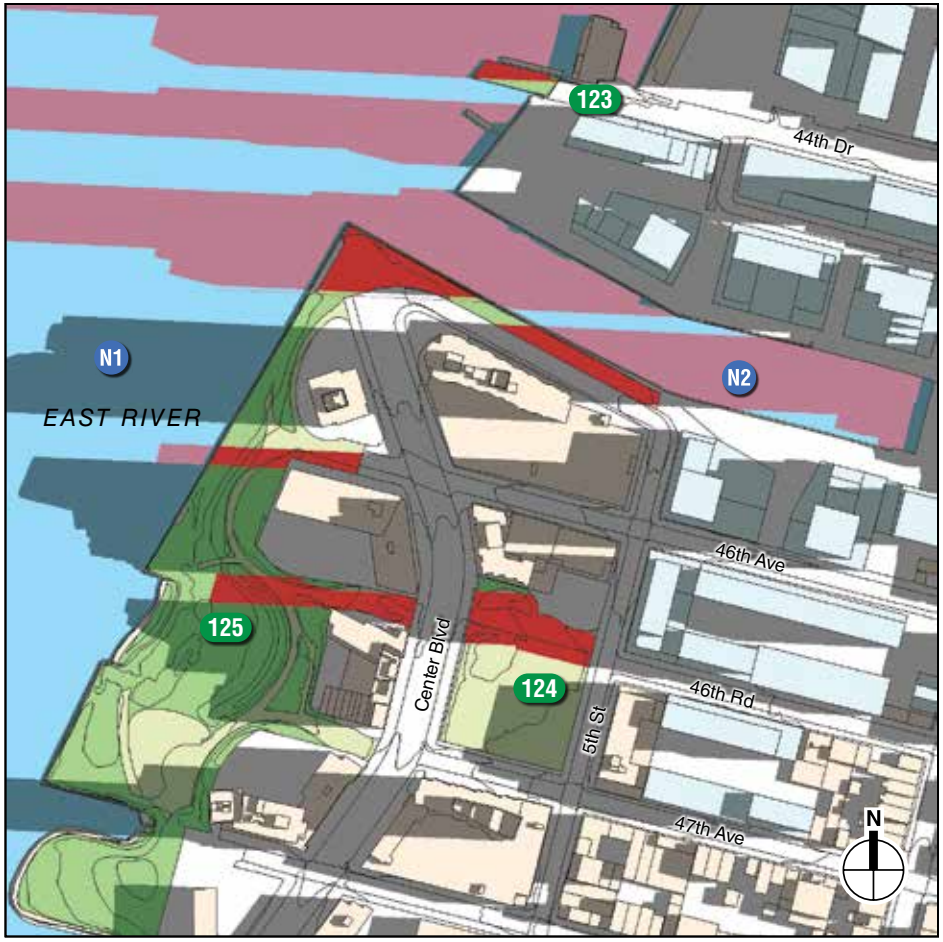


7:30 AM EST (8:30 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

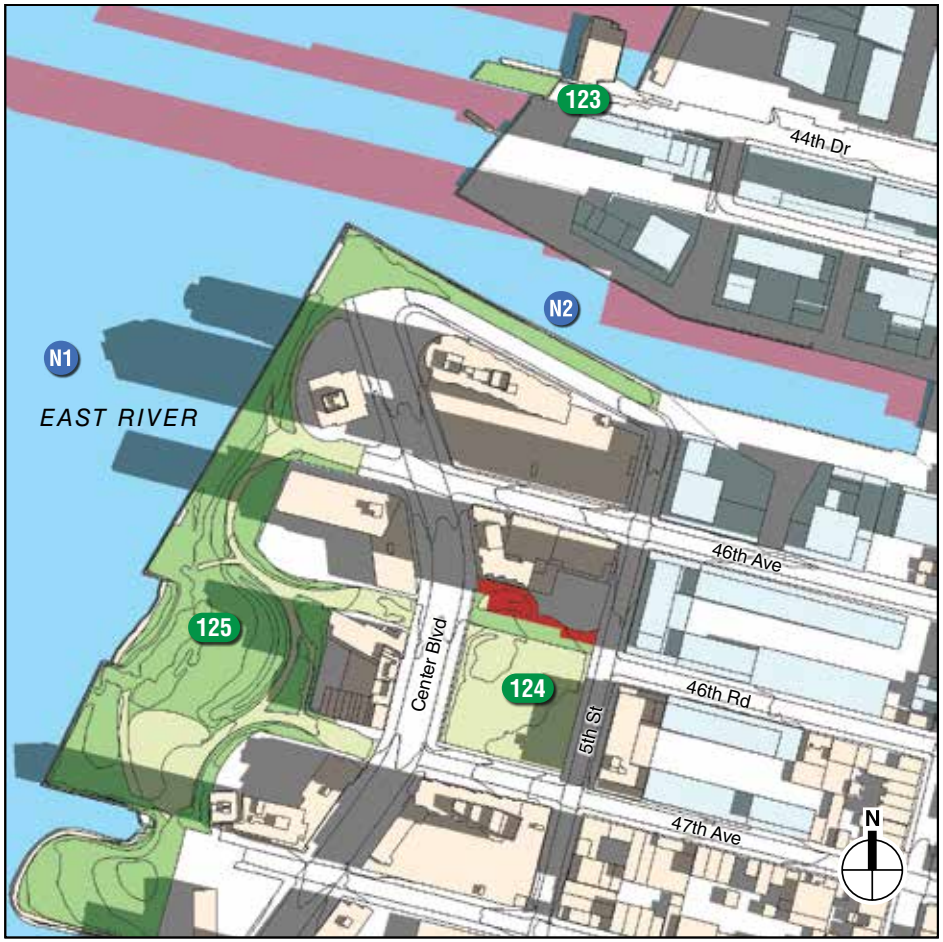
NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

44th Drive Pier (#123),
Queens West Sports Field (#124), and
Gantry Plaza State Park (#125)

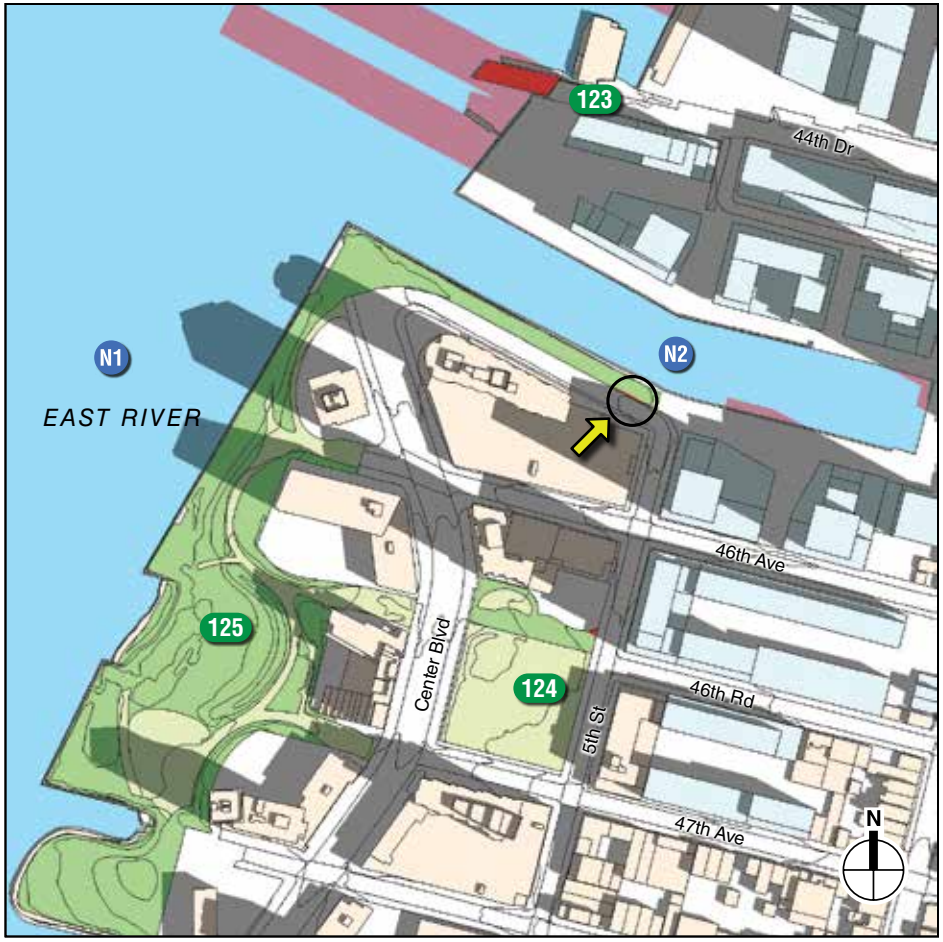
Detailed Analysis
May 6 / August 6

Figure 6-74

2.21.25



8:30 AM EST (9:30 AM EDT)



9:30 AM EST (10:30 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

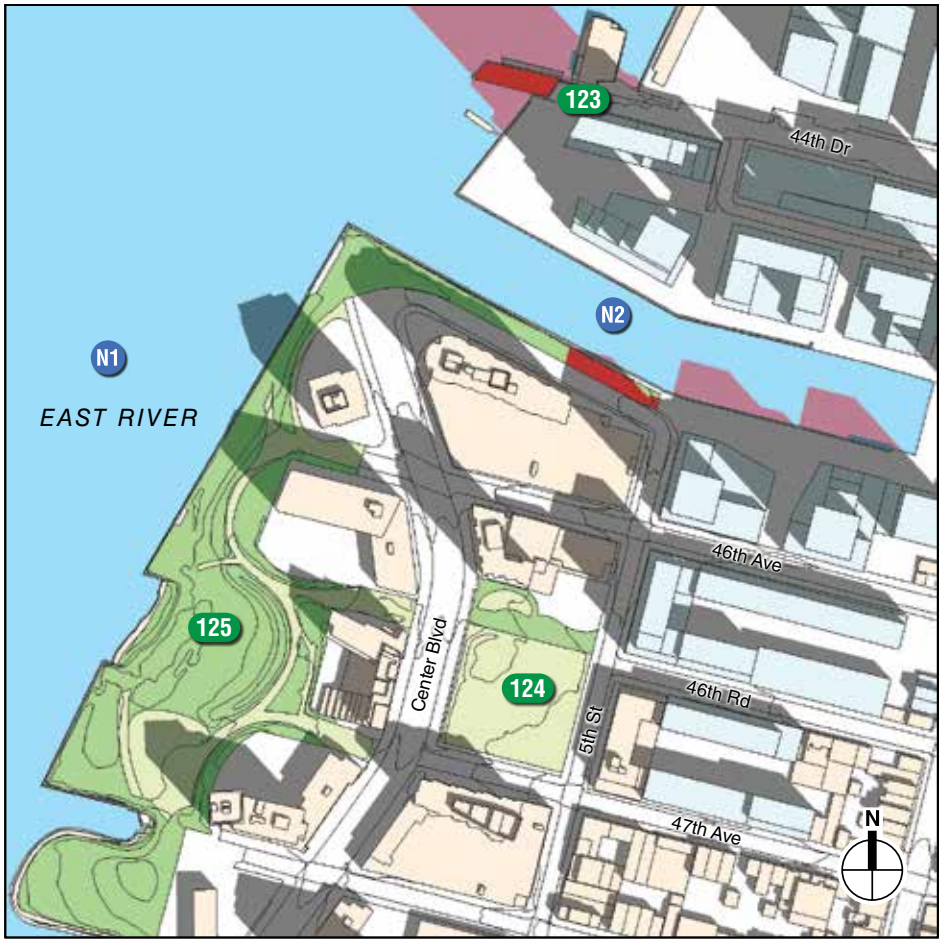
Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

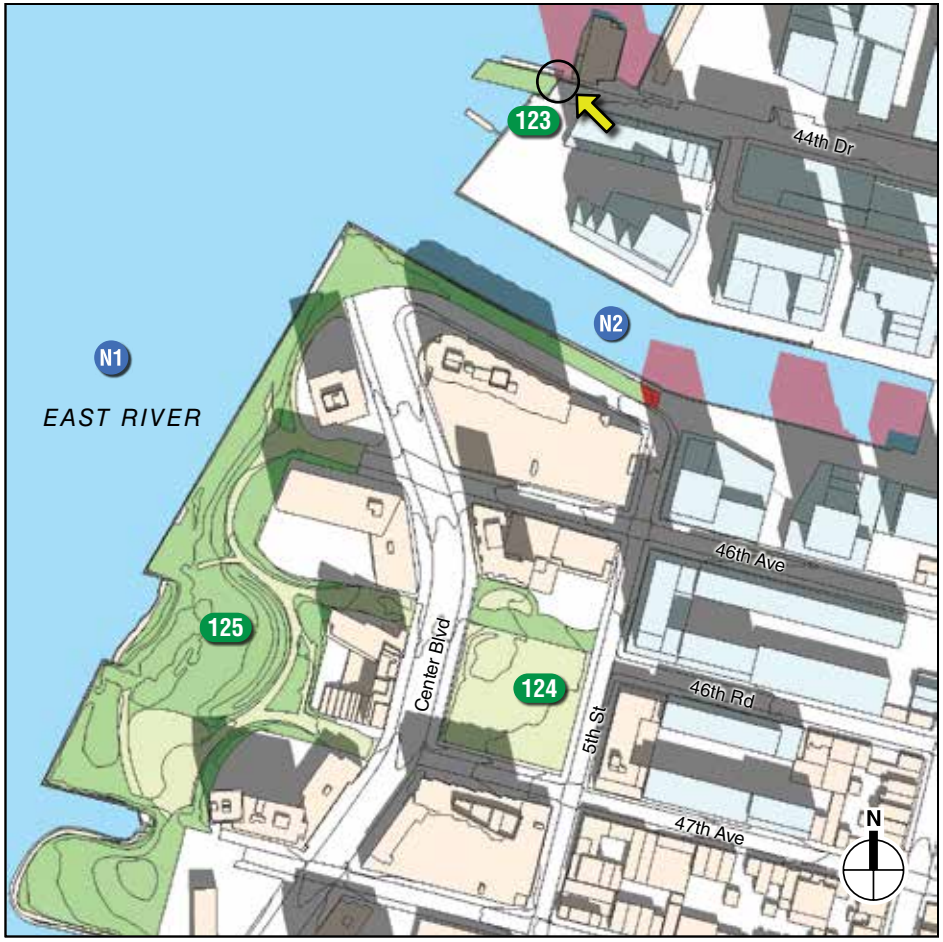
44th Drive Pier (#123),
Queens West Sports Field (#124), and
Gantry Plaza State Park (#125)

Detailed Analysis
May 6 / August 6

Figure 6-75



10:30 AM EST (11:30 AM EDT)



11:30 AM EST (12:30 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

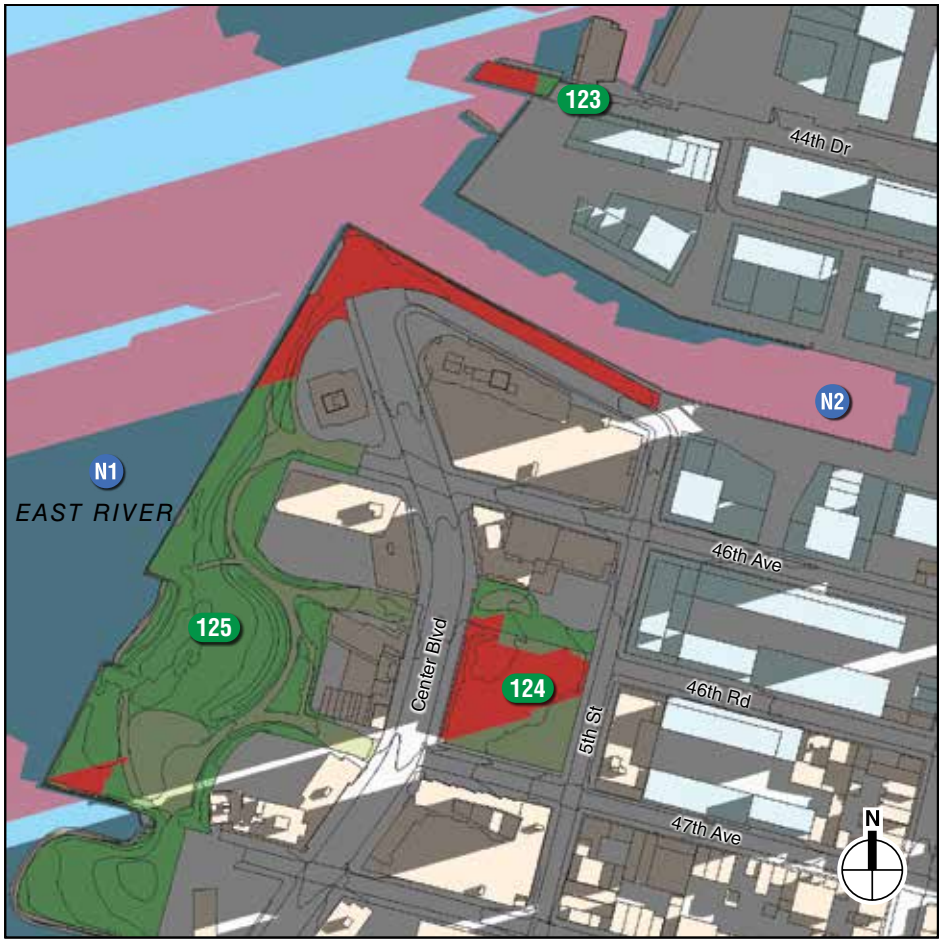
Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
EST = Eastern Standard Time. EDT = Eastern Daylight Time.

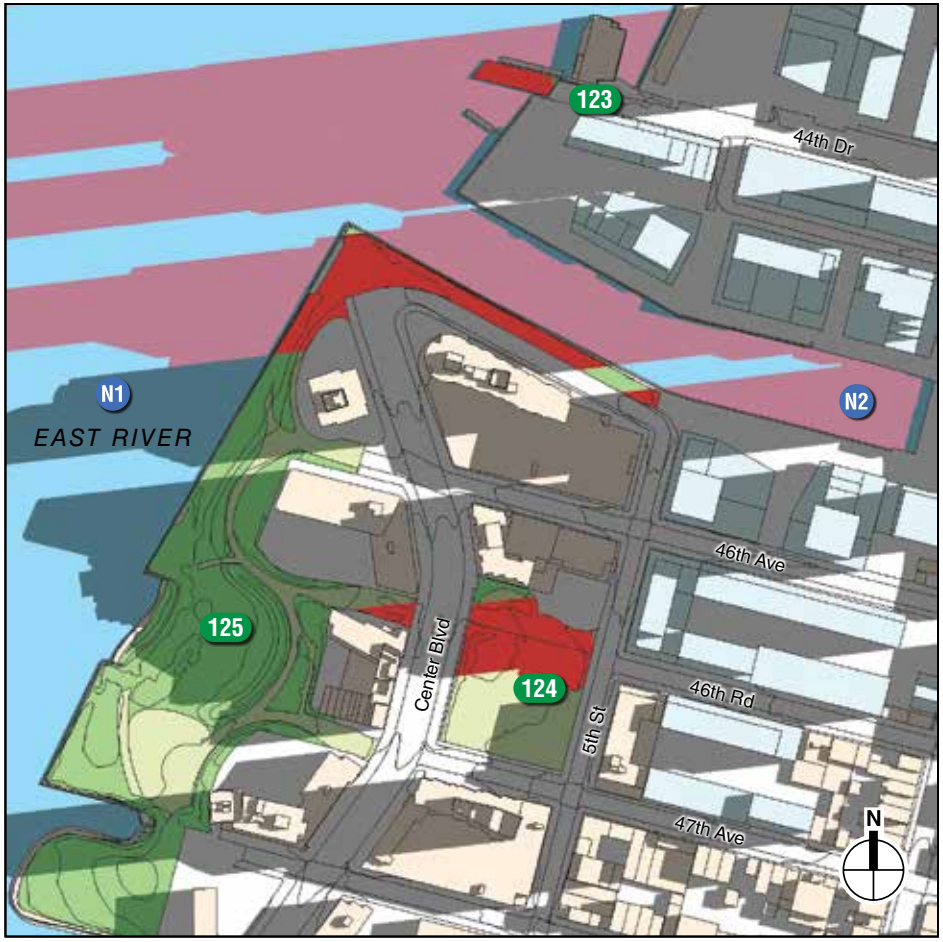
44th Drive Pier (#123),
Queens West Sports Field (#124), and
Gantry Plaza State Park (#125)

Detailed Analysis
May 6 / August 6

Figure 6-76



6:15 AM EST (7:15 AM EDT)



7:15 AM EST (8:15 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
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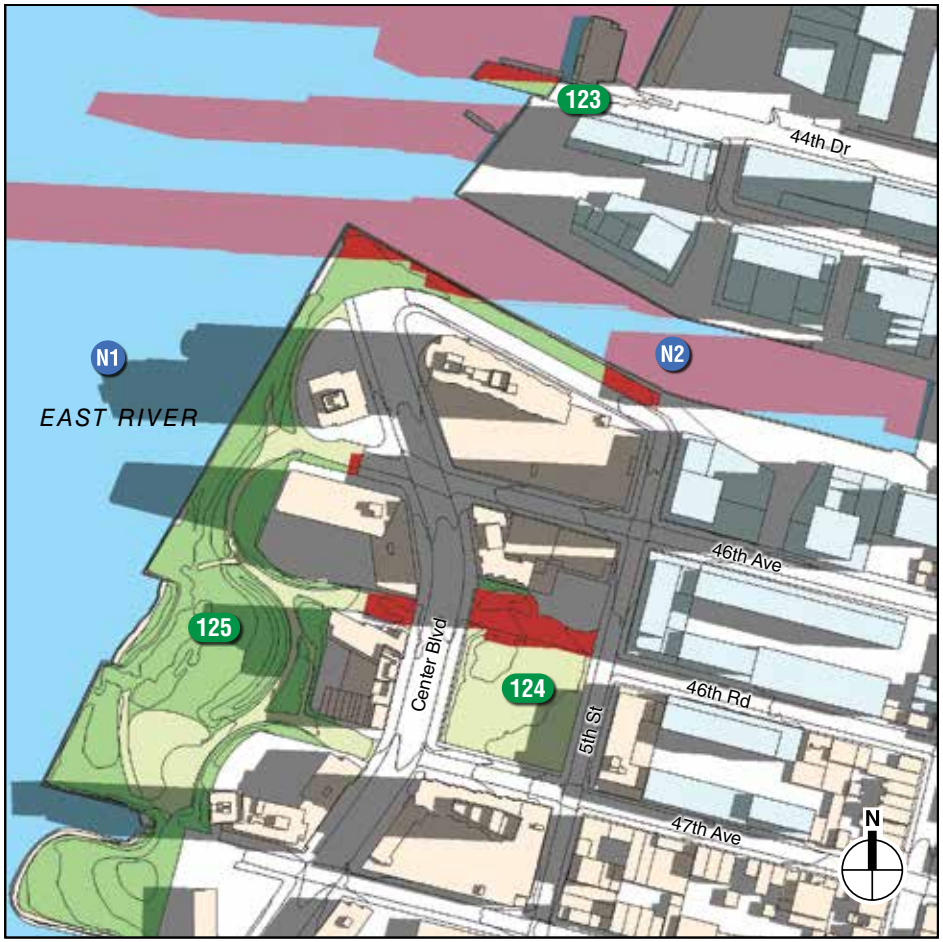
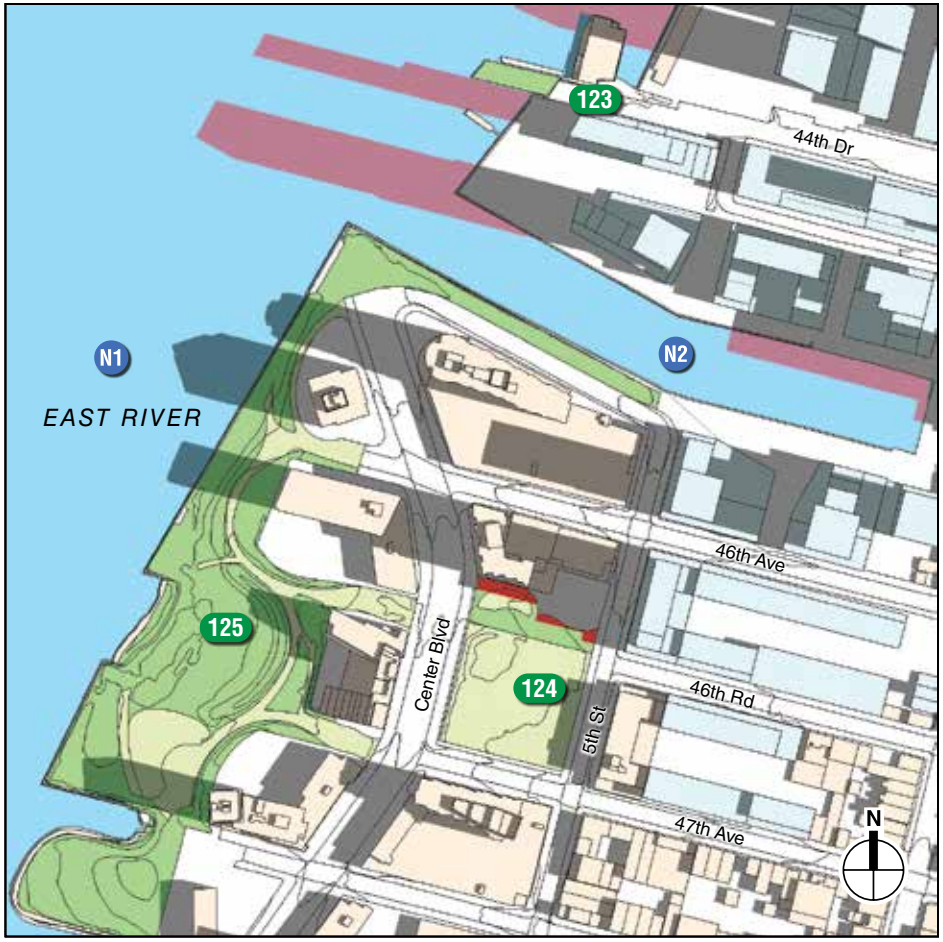
44th Drive Pier (#123),
Queens West Sports Field (#124), and
Gantry Plaza State Park (#125)

Detailed Analysis
June 21

Figure 6-77



8:15 AM EST (9:15 AM EDT)



9:15 AM EST (10:15 AM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
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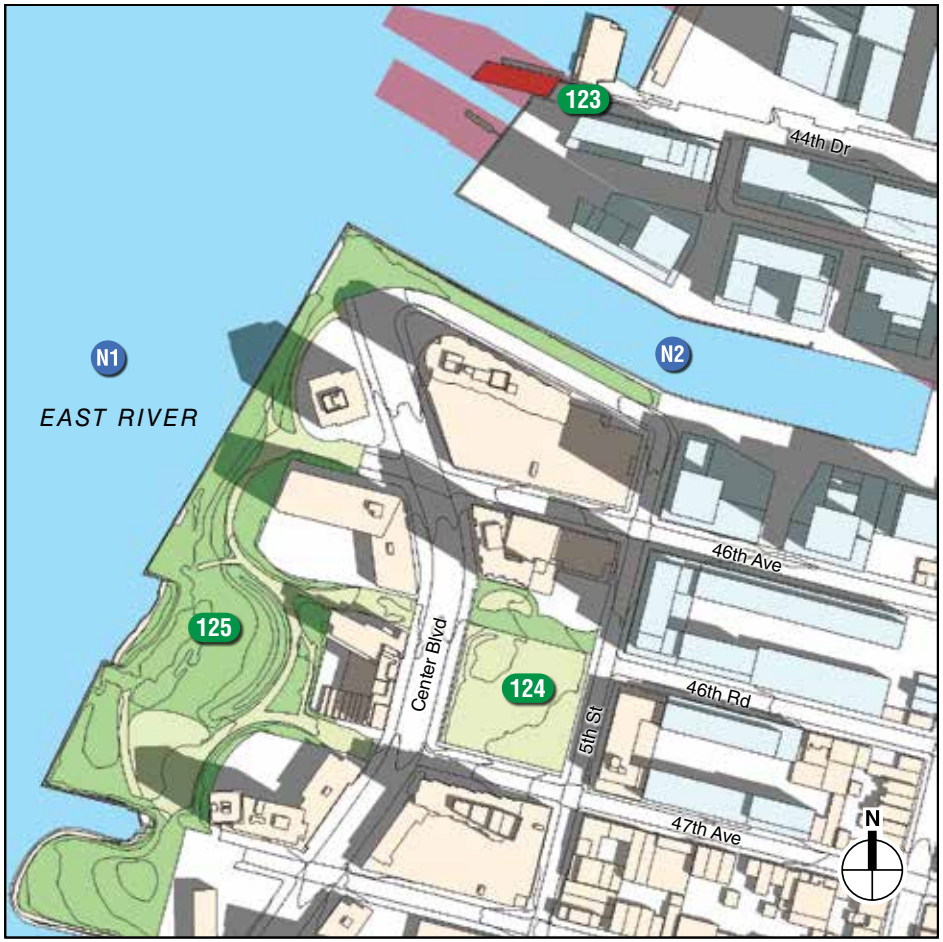
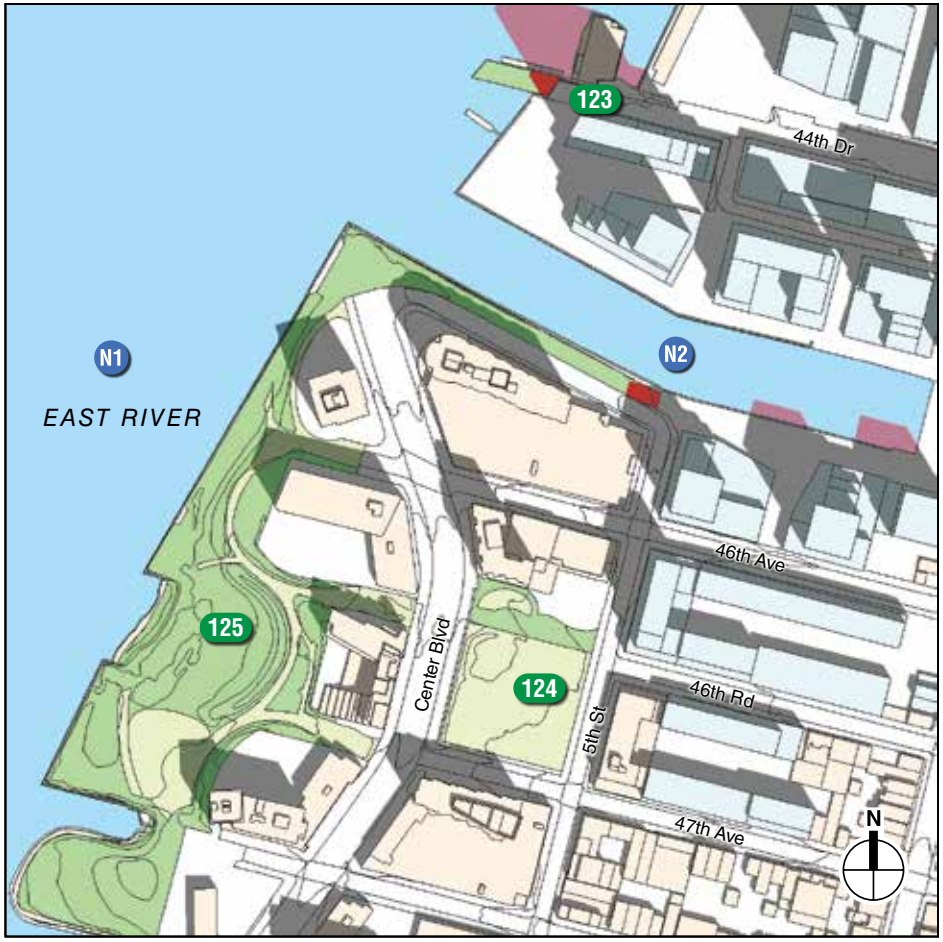
44th Drive Pier (#123),
Queens West Sports Field (#124), and
Gantry Plaza State Park (#125)

Detailed Analysis
June 21

Figure 6-78



10:15 AM EST (11:15 AM EDT)



11:15 AM EST (12:15 PM EDT)

Development Sites

Incremental Shadow

Publicly Accessible Open Space (refer Table 6-1)

Historic Resource with Sunlight-Sensitive Features (refer Table 6-1)

Natural Resources (refer to Table 6-1)

NOTE: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.
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44th Drive Pier (#123),
Queens West Sports Field (#124), and
Gantry Plaza State Park (#125)

Detailed Analysis
June 21

Figure 6-79

Table 6-2
Incremental Shadow Durations

Map Reference	Name	Dec. 21	Mar. 21 / Sept. 21	May 6 / Aug. 6	Jun. 21
100	Queensbridge Park	8:51am to 9:51am 1:11pm to 2:53pm Total 2 hr 42 min	7:36am to 7:50am 8:14am to 8:48am Total 48 min*	6:48am to 7:39am Total 51 min*	—
101	Greenstreet, Vernon Boulevard and 41st Avenue	8:51am to 9:09am 2:21pm to 2:34pm 2:45pm to 2:53pm Total 39 min	—	—	—
102	Greenstreet, Vernon Boulevard and Queensboro Bridge	2:15pm to 2:53pm Total 38 min	7:36am to 7:43am Total 7 min	—	—
103	Greenstreets, Queens Plaza South	8:51am to 2:53pm Total 6 hr 2 min	7:47am to 8:11am 9:27am to 4:29pm Total 7 hr 26 min	10:43am to 5:18pm Total 6 hr 35 min	5:57am to 6:10am 11:32 am to 6:01pm Total 6 hr 29 min
104	Pollinator Place Garden, Queens Plaza South	1:41pm to 2:06pm Total 25 min	9:50am to 1:25pm 1:45pm to 2:45pm Total 4 hr 35 min	11:03pm to 12:10pm 1:00pm to 1:40pm Total 1 hr 47 min	12:00pm to 2:10pm Total 2 hr 10 min
105	Queens Plaza North Greenstreets and Bikeway	8:51am to 11:50am 2:19pm to 2:53pm Total 3 hr 33 min	7:36am to 9:00am 12:30pm to 3:50pm Total 4 hr 44 min	6:27am to 9:15am 1:42pm to 5:18pm Total 6 hr 54 min	6:10am to 9:49am 3:45pm to 6:01pm Total 5 hr 55 min
106	Greenstreet, 29th Street and 41st Avenue	—	—	—	5:13pm to 5:35pm Total 22 min
107	Sven Park	—	—	—	5:14pm to 5:54pm Total 40 min
108	Dutch Kills Green	—	—	4:30pm to 5:18pm Total 48 min	4:20pm to 4:50pm Total 20 min
111	Sundial Park	—	—	—	5:23pm to 5:36pm 5:55pm to 6:01 pm Total 18 min
112	Rafferty Triangle	—	—	5:17pm to 5:18pm Total 1 min	5:51pm to 5:53pm Total 2 min
113	Jackson Avenue Medians	—	—	—	5:36pm to 6:01pm Total 25 min
114	Court Square Park	—	—	—	5:38pm to 5:55pm 5:58pm to 6:01 pm Total 20 min
116	McKenna Triangle	—	—	—	5:33pm to 6:01pm Total 28 min
117	Short Triangle	—	—	—	5:55pm to 6:01pm Total 6 min
118	46th Avenue Plaza	—	—	—	5:44pm to 6:01pm Total 17 min
119	Murray Playground	2:51pm to 2:53pm Total 2 min	3:56pm to 4:29pm Total 33 min	4:06pm to 5:18pm Total 1 hr 12 min	5:57am to 6:33am 4:28pm to 6:01pm 2 hr 39 min
120	12th Street Plaza	8:51am to 11:27am 2:49pm to 2:53pm Total 2 hr 40 min	7:36am to 8:12am 8:59am to 9:03am 3:36pm to 4:29pm Total 1 hr 33 min	6:27am to 7:45am 3:38pm to 5:18pm Total 1 hr 58 min	5:57am to 7:18am 3:00pm to 6:01pm Total 4 hr 22 min
121	11th Street Greenstreets	2:32pm to 2:53pm Total 21 min	3:26pm to 4:29pm Total 1 hr 3 min	3:35pm to 5:18pm Total 1 hr 43 min	6:36am to 7:15am 3:50pm to 6:01pm Total 2 hr 50 min

Table 6-2
Incremental Shadow Durations

Map Reference	Name	Dec. 21	Mar. 21 / Sept. 21	May 6 / Aug. 6	Jun. 21
122	Gordon Triangle	9:45am to 1:05pm 1:13pm to 1:55pm 2:10pm to 2:53pm Total 4 hr 45 min	8:00am to 12:13pm 12:55pm to 4:25pm Total 7 hr 43 min	6:27am to 11:52am 12:30pm to 5:18pm Total 10 hr 13 min	5:57am to 11:35am 12:35pm to 1:20pm 1:41pm to 6:01pm Total 10 hr 43 min
123	44th Drive Pier	8:51am to 11:25am Total 2 hr 34 min	7:36am to 11:30am Total 3 hr 54 min	6:27am to 7:46am 8:39am to 11:32am Total 4 hr 12 min	5:57am to 8:31am 9:19am to 11:43am Total 4 hr 58 min
124	Queens West Sports Field	—	7:36am to 9:00am Total 1 hr 24 min	6:27am to 8:02am Total 1 hr 35 min	5:57am to 8:34am Total 2 hr 37 min
125	Gantry Plaza State Park	8:51am to 12:15pm Total 3 hr 24 min	7:36am to 12:10pm Total 4 hr 44 min	6:27am to 11:42am Total 5 hr 15 min	5:57am to 9:55am 10:45am to 11:42am Total 4 hr 55 min
Historic Resources with Sunlight-Sensitive Features					
H	Sutton Place Historic District garden	9:15am to 9:45am Total 30 mins	—	—	—
O	Queensbridge Houses	8:51am to 2:53pm Total 6 hr 2 min	7:36am to 12:32pm 2:10pm to 4:29pm Total 7 hr 15 min	6:27am to 11:20am 4:56pm to 5:18pm Total 5 hr 15 min	5:57am to 11:00am Total 5 hr 3 min
Natural Resources					
N1	East River	8:51am to 2:00pm Total 5 hr 9 min	7:36am to 3:45pm Total 8 hr 9 min	6:27am to 2:30pm Total 8 hr 3 min	5:57am to 2:00pm Total 8 hr 3 min
N2	Anable Basin	8:51am to 2:53pm Total 6 hr 2 min	7:36am to 3:55pm 4:15pm to 4:29pm Total 8 hr 33 min	6:27am to 4:45pm Total 10 hr 18 min	5:57am to 3:30pm Total 9 hr 33 min

Notes: Table indicates entry and exit times and total duration of incremental shadow for each sunlight-sensitive resource. Daylight saving time is not used—times are Eastern Standard Time, per *CEQR Technical Manual* guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine actual clock time.

* On March 21/September 21, incremental shadow would fall on Queensbridge Park proper for only 5 minutes, but would fall on Queensbridge "Baby" Park for 48 minutes. On May 6/August 6, no incremental shadow would fall on Queensbridge Park proper; all 51 minutes of incremental shadow indicated in the table would fall on Queensbridge "Baby" Park.

ASSESSMENT OF SHADOW IMPACTS BY RESOURCE

The following section briefly describes each affected resource that would receive more than 10 minutes of incremental shadow;[8] its sunlight sensitivity; and the extent, duration, and potential effects of incremental shadow. Descriptions of resource condition and utilization rates are provided in coordination with Chapter 5, "Open Space." Map reference numbers are included with the name, for convenience.

Times are given in Eastern Standard Time (EST) in all seasons, as mandated by the *CEQR Technical Manual*, but Eastern Daylight Time (EDT) is in effect for all representative analysis days except for December 21, and times are also provided parenthetically in EDT when relevant, for informational purposes.

[8] Per *CEQR Technical Manual* guidelines, incremental shadow is not considered significant when its duration is no more than 10 minutes and the resource otherwise continues to receive substantial sunlight. *CEQR Technical Manual*, 2021 edition, page 8-28.

OPEN SPACE RESOURCES

Peter Detmold Park, Manhattan (#39)

Located on a narrow strip of land on the west side of the FDR Drive, the park runs from East 49th to 51st Streets and can be accessed from a staircase leading down from the east end of East 51st Street or a street-level entrance on East 49th Street across from MacArthur Playground. A dog run is located in the northern end of the park, with seating, tables, and plantings in the remainder of the space.

Incremental shadow (from the top of Projected Development Sites 67 and 69) would reach the park early (7:36 AM to 7:55 AM EST/8:36 AM to 8:55 AM EDT) on the March 21/September 21 date but not on any of the other representative dates. The affected area would be proportionally small relative to the overall space, and during the affected 19-minute period the remaining large portion of the park would be entirely in sun (see **Figure 6-6**). Therefore, given the very limited extent and duration of incremental shadow, the Proposed Actions would not cause significant adverse shadow impacts to this park.

East Midtown Greenway, Manhattan (#63)

This stretch of newly constructed open space, spanning from East 53rd Street to East 60th Street, is built over the East River and includes a new pedestrian walkway, landscaping, pedestrian bridge, and separated bike lane.

Incremental shadow (from the top of Projected Development Sites 63, 67, and 69) would reach portions of the linear Greenway early (8:51 AM to 9:58 AM) on the December 21 date but not on any of the other representative dates. The affected areas would be proportionally small relative to the overall length of open space, and throughout the approximately one hour of duration, the remaining large portion of the park would be entirely in sun (see **Figures 6-7 and 6-8**). Therefore, given the very limited extent and duration of incremental shadow, and the likely lower usage of the park during winter mornings relative to other times and dates, the Proposed Actions would not cause significant adverse shadow impacts to this resource.

Sutton Place Park, Manhattan (#65)

Sutton Place Park is a series of several discrete parks along the East River waterfront near Sutton Place between East 53rd and East 59th Streets[9]. All the parks contain seating, plantings, and views of the East River. On the December 21 date, incremental shadow (from Projected Development Sites 63, 67, and 69) would pass across the parks over the course of approximately the first hour of the analysis period, 8:51 AM to 9:52 AM. During this period, the following would occur:

- From 8:51 AM to 9:15 AM, incremental shadow (from Projected Development Site 63) would pass across the southernmost park (bounded by East 53rd and East 54th Streets, Sutton Place, and FDR Drive), covering most of the park for about 10 minutes and then a rapidly decreasing portion for another 15 minutes, while the remainder of the park would be in sun (see **Figure 6-7**).

[9] Sutton Place begins at East 53rd Street where Manhattan widens; north of East 59th Street Sutton Place becomes York Avenue.

- Also beginning at 8:51 AM, incremental shadow (from Projected Development Sites 67 and 69) would fall on portions of the park located on the waterfront (and above the FDR Drive) between East 56th and East 57th Streets. Small at first, the incremental shadow would increase in size, would cover about two-thirds of the space at its greatest extent from 9:05 AM to 9:15 AM, and then would rapidly decrease in size until exiting completely 20 minutes later at 9:35 AM (see **Figures 6-7 and 6-8**). Sunlit areas would remain in the space during this affected period, and after about 9:25 AM most of the park would be in sun until the afternoon.
- Incremental shadow (from Projected Development Site 63) would pass across a smaller park space, located between the two described above, overlooking the East River at the end of East 55th Street, for 13 minutes from 9:28 AM to 9:41 AM (see **Figure 6-8**), including a four-minute period when the increment would eliminate all sunlight.
- The northernmost open space of Sutton Place Park, a smaller space overlooking the East River at the end of East 58th Street, would be in sun until 9:33 AM, when incremental shadow would pass across it for a total duration of 19 minutes, including three minutes when it would eliminate all the sunlight (see **Figure 6-8**). After 9:52 AM, the park would be entirely or mostly in sun until mid-afternoon.

Incremental shadow would not reach Sutton Place Park in spring, summer, or fall.

On December 21, throughout the approximately one-hour duration of incremental shadow, sunlit areas would remain available to users of Sutton Place Park, and the park would be mostly or fully in sun from mid-morning into the afternoon, as the sun moves through the eastern and southern sky. Given these factors, plus the likely lower usage of the parks during winter mornings relative to other times and dates, the limited extent and duration of incremental shadow resulting from the Proposed Actions would not cause significant adverse shadow impacts to Sutton Place Park.

Franklin D. Roosevelt Four Freedoms Park, Roosevelt Island (#83)

Located at the southernmost point of Roosevelt Island, this park contains trees and a large lawn; wide, paved paths; and a granite plaza with ledge seating at its tip, offering views of the river and the Manhattan and Queens waterfronts.

Incremental shadow (from Projected Development Sites 63, 67, and 69) would move across portions of this park early in the morning on all representative dates, ranging in duration from five minutes in winter to 33 minutes in midsummer to approximately an hour and a half in the late summer, fall, and spring (see **Figures 6-9, 6-12, 6-13, 6-15, and 6-16**). The shadow increment would be limited in coverage, with most of the park in sun at all times for users seeking sunlight during the affected period. The park would then be entirely in sun from midmorning to late afternoon in all seasons, providing ample sunlight for the park's vegetation. Therefore, the incremental shadow resulting from the Proposed Actions would not significantly impact this park in any season.

Southpoint Park, Roosevelt Island (#84)

Southpoint Park is located near the southern end of Roosevelt Island, north of Franklin D. Roosevelt Four Freedoms Park and the Renwick Smallpox Hospital Memorial, and south of the Cornell Tech campus open space. Paths, benches and ledge seating, trees, and landscaping are located throughout the park.

Incremental shadow primarily from Projected Development Sites 63, 67, and 69 would pass across this park in the morning the fall, winter, and early spring, and very minimally in the late spring and summer. On the December 21 date, the incremental shadow would briefly cover most of the park for the first 20 minutes of the analysis period (starting at 8:51 AM), but winter morning shadows move quickly and by 9:15 AM, half of the southern half of the park would be in sun, by 9:30 AM two-thirds of the park would be in sun, and by 10:00 AM 90 percent of the park would be in sun (see **Figures 6-9 and 6-10**). The shadow would exit completely at 10:20 AM. On March 21 and September 21, incremental shadow primarily from Projected Development Sites 67 and 69 would pass across the park from 7:36 AM to 9:45 AM but most of the park would remain in sun throughout this period (see **Figures 6-12 to 6-14**). On May 6 and August 6, incremental shadow would pass across the southeast corner of the park with over 95 percent of the park in sun during this 33-minute period.

Aside from about 20 minutes on winter mornings, when park usage would likely be low, this park would remain mostly or entirely in sun throughout the day, including during the periods of incremental shadow, and therefore the Proposed Actions would not cause significant shadow impacts to this resource.

West Esplanade and East Esplanade, Roosevelt Island (#85 and #86)

Also known as the Roosevelt Island Greenway, this linear, landscaped promenade and bike path encircles the island along its waterfront north of Southpoint Park. Within the shadow study area, on either side of the Cornell Tech Campus, benches and cherry blossom trees line the esplanade.

Incremental shadow primarily from Projected Development Sites 63, 67, and 69 would pass across portions of the West and East Esplanades throughout the winter mornings, but long sections of both Esplanades, as well as adjacent park areas, would be in sun throughout the period, and therefore park users seeking sun would not be significantly affected (see **Figures 6-9 to 6-11**). The cherry blossom trees and other vegetation would not be significantly affected either, as winter is outside the growing season. On the March 21/September 21 analysis date, incremental shadow would fall on a very small (relative to the overall resource) section of the East Esplanade for about an hour 9:00 AM to 10:00 AM (see **Figure 6-14**), but this section would be in sun for the remainder of the day, and other sections would be in sun during the affected hour, and the increment would therefore not significantly impact the resource on this date either.

Cornell Tech POPS, Roosevelt Island (#87)

The northern part of the Cornell Tech Campus is developed with several buildings with public open space between and adjacent to them. The southern part of the campus will be developed as well, but it is not anticipated to be completed until after the 2035 Build Year. It will likely be under construction in 2035, and the finished development is expected to contain some additional public open space.

Incremental shadow primarily from Projected Development Sites 63, 67, and 69 would cover much of the southern part of Cornell Tech Campus during approximately the first hour of the December 21 date (see **Figure 6-9**). By 10:00 AM, the incremental shadow would be much reduced in size and would continue to decrease in size until exiting the resource at 11:44 AM (see **Figures 6-10 and 6-11**). There would always be sunlit park

areas nearby, e.g., in Franklin D Roosevelt Four Freedoms Park and/or Southpoint Park and/or the Esplanades, throughout the affected period, and on the campus after the first hour (and small areas even during the first hour), and therefore users would not be significantly impacted. The trees, lawns, and other plantings would not be significantly affected either, as winter is outside the growing season. On the March 21/September 21 date, incremental shadow would fall on a very small (relative to the overall resource) section of the campus for approximately one half-hour (see **Figure 6-14**), but this section would be in sun for the remainder of the day, and other sections would be in sun during the half-hour period, and the increment would therefore not significantly impact the resource on this date either.

Greenstreets median: Vernon Boulevard Between 41st Avenue and 40th Avenue (#99); 41st Avenue and Vernon Boulevard (#101); and Vernon Boulevard and Queensboro Bridge (#102)

The three planted medians are located in Vernon Boulevard (#99 and #102) and in 41st Avenue where it intersects Vernon Boulevard (#101). They would receive between 20 and 40 minutes of incremental shadow on the winter analysis date, which falls outside the growing season and as such would not adversely affect their plantings (see **Figures 6-17 and 6-20**). The median just north of the Queensboro Bridge would receive 7 minutes of incremental shadow on the fall and early spring date (see **Figure 6-21**), but this duration would be too brief to meaningfully affect the plantings in the median.

Queensbridge Park (#100)

This large park located between Vernon Boulevard and the East River, and bounded on the south by the Queensboro Bridge and on the north by the Ravenswood Generating Station (except for one small noncontiguous section of the park discussed separately below), is characterized by a variety of facilities, including baseball fields, a soccer-football combination field, basketball, volleyball and handball courts, a playground with see-saws, swings and jungle gyms, a public restroom, picnic areas, sitting areas, walkways, greenery, and trees.

The park would not receive any incremental shadow in the late spring and summer months, and a minimal amount in fall and early spring (5 minutes). On the winter analysis date, it would receive an hour of incremental shadow in the morning, from multiple projected development sites along Queens Plaza South and east of the Queensbridge Houses (see **Figure 6-17**), and an hour and 42 minutes in the afternoon from Projected Development Sites 67 and 69 (see **Figures 6-19 and 6-20**). During both periods of incremental shadow, large areas of the park would remain in sun. Furthermore, early and late-day winter shadows move relatively quickly, covering different parts of the park at different times as they move. Consequently, these shadows would not significantly impact park users, nor would they impact vegetation in winter, which is outside the growing season.

One small noncontiguous section of Queensbridge Park, referred to as Queensbridge “Baby” Park because of its very small size, is nestled between the Queensbridge Houses complex to the north and the Queensboro Bridge to the south and overhead. It is currently being reconstructed and will include two grassy lawns, a pair of paved plazas on what is currently a fenced-off maintenance yard owned by New York City Department of Parks

and Recreation (NYC Parks), trees and other plantings, benches, drinking fountains, ping-pong tables and tables for games like chess and checkers.

Queensbridge "Baby" Park would be mostly or completely in existing shadows from the bridge and other structures throughout the winter analysis date; there would be slivers of incremental shadow for 40 minutes in the morning and about 90 minutes in the afternoon, so small as to be indistinguishable from the existing shadows covering the vast majority of the space (see **Figures 6-17 and 6-20**). In the spring, summer, and fall, there would be approximately 50 minutes of new shadow but it would occur very early and would be gone by 8:48 AM (9:48 AM EDT) or earlier, depending on the month. The park would then be mostly or entirely in sun in these seasons from mid-morning until mid/late afternoon, when the bridge's shadow moves over it. Consequently, given the limited incremental shadow and the available sun through most of the day, the Proposed Actions would not cause significant adverse impacts to this resource.

Greenstreets Medians, Queens Plaza South (#103)

Greenstreets medians containing trees (but no seating or other amenities) extend down the middle of Queens Plaza South for five blocks between Vernon Boulevard and 13th Street. These medians, in particular the three between 10th and 13th Streets, would receive between six and a half to seven and a half hours of new shadow throughout the growing season (see **Figures 6-22 to 6-25, 6-28 to 6-32, and 6-35 to 6-37**), as well as in winter (see **Figures 6-17 to 6-20**) from the adjacent projected development sites located on Queens Plaza South between 10th and 13th Streets. This extensive duration of new shadows would be expected to cause significant adverse impacts to any trees and plantings in the medians.

Pollinator Place Garden, Queens Plaza South (#104)

Since June 2021, NYC Parks has announced the completion of 17 Pollinator Place gardens across the five boroughs, one of which is located along a two-block stretch of Queens Plaza South between 23rd Street and Crescent Street. The garden contains native plants that are beneficial to a diverse population of pollinators (butterflies, bees, etc.) as well as birds and small mammals.

The 25 minutes of incremental shadow on the winter analysis date would not adversely impact the garden due to its limited duration and the fact that it would occur outside the growing season. On the March 21/September 21 analysis date some locations in the western part of the garden would see direct sunlight reductions of up to one and a half hours where these locations were already receiving substandard amounts of sunlight in the No Action condition, of around three and a half hours (see **Figures 6-38 to 6-40**). Other locations in the garden, on the eastern side, would remain unaffected by incremental shadow. In the late spring and summer months, approximately two hours of incremental shadow would fall on the garden but on the eastern side, while the western side would remain unaffected, and all areas of the garden would receive a minimum of four to six hours of direct sunlight throughout May to August, the heart of the growing season. Therefore, the incremental shadow would not be likely to cause significant adverse impacts to the Pollinator Place garden.

Queens Plaza North Greenstreets/Bikeway (#105)

A two-lane bike path flanked by landscaped medians extends from Dutch Kills Green along Queens Plaza North and then along the southern boundary of Queensbridge Houses to connect with Vernon Boulevard.

In the early mornings in all seasons, incremental shadow would fall on sections of the bikeway in the Queensbridge Houses, and between 21st and 23rd Streets (from Projected Development Site 19) in the spring, summer, and fall. In the afternoons of the spring, summer, and fall, and very briefly in winter, slivers or small patches of incremental shadow from Projected Development Sites 20 and 22 would fall intermittently on the sections between 24th and 29th Streets.

Some sections of this linear, active recreational resource would be in sun at any given time (with the limited exception of very late afternoons in the fall, winter, and early spring months when longer shadows from the adjacent bridge structures would shade most of Queens Plaza North). Therefore, the comparatively smaller areas of incremental shadow would not be significant, as users (primarily cyclists but also pedestrians) move through the shaded areas to sunnier areas.

Greenstreet, 29th Street and 41st Avenue (#106)

This paved triangle, newly developed with several tree pits, would receive 22 minutes of new shadow in the very late afternoon of the June 21 analysis date only (see **Figure 6-46**). This limited duration would not cause significant adverse impacts to the trees, which receive approximately six to eight hours of direct sunlight throughout that midsummer analysis date.

Sven Park (#107)

This new park (completed in 2023) would receive 40 minutes of new shadow in the very late afternoon of the June 21 analysis date only. The park would be almost entirely in existing shadows at this late hour (5:14 PM to 5:54 PM/6:14 PM to 6:54 PM EDT), and overlapping shadow from Projected Development Site 19, 6 blocks to the west, would fill in the remaining slivers of sunlight (see **Figure 6-46**). This new shadow would not change the look and feel of the shady space at that time for users, and this limited coverage and occurrence on the midsummer date only would therefore not cause significant adverse impacts to this resource.

Dutch Kills Green (#108)

This park in Queens Plaza, completed in 2012 and replacing a parking lot, contains paths through native-plant wetlands, benches, a small amphitheater, and two Dutch millstones from the 1600s.

It would receive between 20 and 50 minutes of new shadow from Projected Development Site 22 in the late afternoons of the late spring and summer months. The increment would be limited in size, particularly on the June 21 date, and would cover only a portion of the space while another portion would remain in sun. The space would continue to receive many hours of sun in the mornings and early afternoons on these late spring and summer dates, due in part to the lack of tall structures to its east where the Sunnyside Yards are located. Therefore, the limited new shadow would not cause significant adverse impacts to either the use or the vegetation in this resource.

Sundial Park (#111), Rafferty Triangle (#112), Jackson Avenue Medians (#113), Court Square Park (#114), McKenna Triangle (#116), Short Triangle (#117), 46th Avenue Plaza (#118)

These small parks, plazas, and triangles are located in the vicinity of Court Square and along Jackson Avenue, generally south and southwest of the development sites (see Figure 6-47). They each receive between 2 and 28 minutes of incremental shadow at the end of the June 21 analysis date (and one receives 1 minute on the May 6/August 6 date), between 5:30 PM and 6:00 PM (6:30 PM and 7:00 PM EDT). The incremental shadow would be too brief and/or limited in coverage to significantly affect these spaces. Furthermore, portions of Court Square Park, which is adjacent or within sight of all these spaces, would remain in sun throughout the final 30 minutes for users seeking sun.

Murray Playground (#119)

John F. Murray Playground is located between 45th Avenue and 45th Road and 11th and 21st Streets. It contains a playground, a synthetic athletic field, paved ball courts, and a concentration of benches and landscaping in the park's eastern half.

The park is located south of most of the development sites. Portions of the park could be reached by incremental shadow at the end of the analysis period, in the late afternoon and would range in duration from two minutes in winter to a half-hour in fall and early spring to just over an hour on May 6 and August 6 to two hours on June 21. These shadow increments would come from development sites west of the park. On the June 21 date, incremental shadow would also reach a portion of the park first thing in the morning for 30 minutes (until 6:33 AM).

In the fall and early spring, the coverage area of the late afternoon incremental shadow would be mostly limited to the western end of the park, falling on the paved basketball and handball courts and a small portion of the synthetic turf athletic field, and would be limited to a half-hour in duration (see **Figure 6-56**). The vast majority of the park would remain in sun during the affected period and throughout the day.

In the late spring and summer months, the park would be mostly or entirely in sun for virtually the entire day (after 6:30 AM on May 6/August 6 and 7:00 AM on June 21). On May 6 and August 6, incremental shadow would pass across the park during the last hour of the analysis period (which ends at 5:18 PM EST/6:18 PM EDT); however, half or more of the park would remain in sun even during this period (see **Figure 6-62**). On the June 21 analysis date, incremental shadow would enter the northwest corner of the park at about 4:30 PM EST/5:30 PM EDT and gradually increase in size, extending eastward, until by about 5:20 PM (6:20 PM EDT) it would cover the northern half of the park, by 5:35 PM (6:35 PM) the northern two-thirds of the park, and the entire park during the last few minutes of the day at about 6:00 PM EST/7:00 PM EDT (see **Figure 6-68**).

As described above, and shown in the **Figures 6-52 to 6-68**, Murray Playground would be mostly or entirely in sun throughout virtually the whole day in the spring, summer, and fall, and even during the brief periods of incremental shadow in the late afternoon (and early morning on June 21) much of the park would remain in sun, with the exception of the last half-hour of the midsummer representative date only. Consequently, these new shadows resulting from the Proposed Actions would not cause significant adverse impacts to either the vegetation or the use of Murray Playground.

12th Street Plaza (#120)

This one-block stretch of 12th Street between 44th Avenue and 43rd Road was inaccessible to vehicle traffic and used as parking until it was redeveloped in 2019 as a pedestrian plaza with seating along the eastern half and western edge and a few trees in planters.

Incremental shadow would fall on portions of this plaza in all seasons. In the spring, summer, and fall incremental shadow would fall in the early mornings and late afternoons, and would generally cover only a portion of the plaza area. The plaza would remain partially or entirely in sun from midmorning to late afternoon (4:00 PM [5:00PM EDT]) in the spring, summer, and fall months. On winter mornings, most of the plaza would be in existing shadow and incremental shadow would eliminate all or most of the remaining sun from 8:51 AM to 10:00 AM and a smaller portion of the remaining sun until 11:30 AM, but the plaza would be mostly or partially in sun from then until the end of the analysis day, with only a sliver of incremental shadow during the last few minutes around 2:50 PM.

The plaza would continue to provide sunlit areas for neighborhood users throughout the day from midmorning to late afternoon in the spring, summer, and fall, and from late morning to midafternoon in winter (when usage would likely be lower due to colder outdoor temperatures). Therefore, the incremental shadows would not be likely to cause significant adverse impacts to this resource.

11th Street Greenstreets (#121)

The 11th Street Greenstreets medians are located along 11th Street between 48th Avenue and 44th Drive. The medians contain small trees and landscaping but no seating or other amenities.

These medians would receive incremental shadows from the development sites to their west in the late afternoons during the growing season months, and would range from one hour in fall and early spring to nearly three hours on the midsummer analysis day. However, the affected medians would continue to receive four to six hours or more of direct sunlight throughout the growing season months, and therefore their trees and vegetation would not be significantly affected by the incremental shadow.

Gordon Triangle (#122)

Gordon Triangle is a small public open space located on 44th Drive between Vernon Boulevard and 10th Street. It typically has low utilization. Sunlight-sensitive features include benches, trees, and other plantings.

This space is situated adjacent to and among many projected development sites; in particular, to its southeast and southwest, and as shown in **Figures 6-48 to 6-68**, it would receive substantial amounts of incremental shadow throughout the day in all seasons. Total durations of incremental shadow would range from nearly 5 hours in winter to nearly 8 hours in fall and early spring to between 10 and 11 hours in late spring and summer. The space would be partially or entirely in incremental shadow for periods of time occurring from midmorning to late afternoon. The Proposed Actions would therefore cause significant adverse impacts to both the use and the plantings of this space.

44th Drive Pier (#123)

The 44th Drive Pier is a public open space located at the western end of 44th Drive that extends approximately 150 feet into the East River. The pier contains two rows of benches, and does not contain any plantings or other vegetation.

The pier would be partially or entirely shaded by the projected development sites to its immediate east and south intermittently from early morning until midday, as shown in **Figures 6-69 to 6-79**. Total durations of morning incremental shadow would range from two and a half hours in winter to between four and five hours in the spring, summer, and fall. The Proposed Actions would therefore cause significant adverse impacts to the use of the space in the spring, summer, and fall. The pier would remain in sun throughout the afternoon in all seasons.

Queens West Sports Field (#124)

Queens West Sports Field is a large synthetic turf sports field on the west side of 5th Street between 46th Road and 47th Avenue. Incremental shadow would fall on portions of the field in the spring, summer, and fall seasons, in the early mornings. On the fall and early spring representative date, the shadow increments would be minimal, slivers among existing shadows, and would be gone by 9:00 AM (see **Figures 6-71 and 6-72**). On the late spring and summer representative dates, the size of the shadow increment would be large very briefly at the start of the analysis day (6:00 AM to 7:00 AM) but small after that, and would exit completely by 8:30 AM (see **Figures 6-74, 6-75, 6-77, and 6-78**). The field would be mostly or entirely in sun for the rest of the day in these seasons. Therefore, given the limited extent and duration, and the fact that their occurrence would be limited to early mornings, the new shadows resulting from the Proposed Actions would not cause significant adverse impacts to this athletic field.

Gantry Plaza State Park (#125)

Gantry Plaza State Park is a large public open space located along the East River between 50th Avenue and North Basin Road. Sunlight-sensitive features include a playground, benches throughout the park and on the esplanade along the East River, a dog run, and large lawns. Trees and landscaping can be found throughout the park.

There are large existing buildings in between the park and projected development sites, which would block substantial amounts of project-generated shadow that would otherwise reach the park in the mornings.

On the winter analysis date, incremental shadow would be limited to slivers and small patches in and around existing shadows on the linear waterfront areas adjacent to North Basin Road, occurring during the first half of the day until about noon (see **Figures 6-69 and 6-70**). These would likely be barely noticeable to users compared to the No Action condition and would not significantly affect park use.

On the March 21/September 21 date, similarly, small patches and narrow bands of incremental shadow would fall among the large existing shadows in the early to mid-morning primarily along or near the northernmost waterfront areas. Also, the dog run and sitting area north-adjacent to the Queens West Sports Field would be briefly covered in incremental shadow for the first 30 minutes of the analysis day, but by 8:00 AM more than half the space would be in sun and the increment would continue to decrease after that and exit (see **Figures 6-71 to 6-73**).

On the May 6/August 6 analysis date, larger areas of incremental shadow would reach areas of the park briefly in the early morning but these would largely be gone before 8:30 AM, except from the dog run and sitting area north of the athletic field, which would be entirely in shadow (incremental and existing) until about 7:50 AM, half in incremental shadow and half in sun by 8:30 AM, and mostly or entirely in sun after 9:00 AM (see **Figures 6-74 and 6-75**). A shadow increment from Projected Development Site 64 would pass across a small portion of the waterfront where it terminates at North Basin Road and 5th Street, for about an hour, but adjacent areas of the waterfront park area would be in sun during this time (see **Figures 6-76**). Sunlit areas would remain available for users in Gantry Plaza State Park on this analysis date even early in the morning, and large sunlit areas would be available after 8:00 AM and for the remainder of the day. Therefore, the incremental shadow would not significantly impact the park on this date.

On the June 21 analysis date, similarly, most of the park north of 47th Avenue would be in shadow (mostly existing, some incremental) early in the morning, but by 8:15 AM much of the park would be in sun and incremental shadow would be largely limited to small areas of the Anable Basin waterfront and the dog run and sitting area north of the athletic field, which would be entirely in incremental shadow at this time (see **Figures 6-77 and 6-78**). However, incremental shadow would continue to move east and away from the park, and by 9:15 AM, the dog run and sitting area would be largely in sun and no other incremental shadow would be on any part of Gantry Plaza State Park in the vicinity of the Project Area. Plenty of sunlit areas would remain available for park users even as early as 7:00 AM, and large sunlit areas would be available after 8:00 AM and for the remainder of the day (see **Figure 6-79**). Therefore, the incremental shadow would not significantly impact the park on this date.

HISTORIC RESOURCES

Sutton Place Historic District Garden (H)

The Sutton Place Historic District, listed on the State and National Registers of Historic Places, is a private residential development of 12 contributing houses and a shared garden, designed and built mostly in the early 1920s. The garden contains a grassy lawn bordered by flower beds, bushes, and trees, and today retains much of its original appearance. The garden's plantings are sensitive to potential adverse impacts from incremental shadows.

On the December 21 date, incremental shadow (from Projected Development Sites 67 and 69) would pass southwest to northeast across the garden from 9:15 AM to 9:45 AM. Small at first, the incremental shadow would increase in size to cover the entire garden at its greatest extent for about two minutes at 9:30 AM, and then would decrease in size until exiting completely 15 minutes later at 9:45 AM. The garden would be entirely in sun before 9:15 AM and after 9:45 AM until the afternoon when existing shadows would start to move across it.

Shadows in winter are assumed not to be significant to the health of plantings and vegetation, and no incremental shadow would reach the garden in the spring, summer, and fall. Therefore, the limited winter incremental shadow resulting from the Proposed Actions would not cause significant adverse shadow impacts to this resource.

Queensbridge Houses North and South (M)

This New York City Housing Authority (NYCHA) public housing complex has been designated as eligible for listing on the New York State and National Registers of Historic Places. It is the largest housing project in North America, containing 96 buildings spanning six superblocks. The substantial open spaces, landscaped walks, and recreation areas, while intended for residents rather than the general public, were included in the original site plan and are considered contributing factors to the architectural significance of the development.

Incremental shadows would move across portions of the complex throughout the mornings in all seasons, from projected development sites east-adjacent to the complex, and to a lesser extent in the afternoons in fall, winter, and early spring for about two and a half hours, primarily from the project development sites along Queens Plaza South. There would also be a brief (up to 20 minutes) and very small incremental shadow in the late afternoon of the late spring and summer months, from one of the Queens Plaza South Sites.

With the exception of the first hour and the last few minutes of the winter date, the extent of the shadow increments would be limited in size relative to the overall complex and there would continue to be large areas of sunlit landscapes, walks, and recreation areas available for the appreciation of this architectural resource. Therefore, the incremental shadows would not cause significant adverse shadow impacts to this resource.

NATURAL RESOURCES

East River and Anable Basin (N1 and N2)

The East River is a tidal strait and sunlight-sensitive natural resource that connects western Long Island Sound with the Upper New York Bay. Anable Basin is an approximately 1,000-foot-long artificial inlet of the river located between 45th Road and 45th Avenue, and adjacent to Projected Development Sites 63, 64, 65, and 71.

With the Proposed Actions, the East River and Anable Basin would receive incremental shadow on all four analysis days, throughout the morning and into the mid-afternoon, primarily from the adjacent waterfront sites. Although the coverage area of the new shadow would be substantial at times and the total duration on the river and basin would last for hours, the new shadow would not substantially alter the condition of the East River or Anable Basin. Most affected areas would continue to receive at least several hours of direct sunlight on all but the shortest days of the year.

In the East River, areas of new shadow would move over the course of the day, not falling on one particular area for long. The areas of the East River that would receive the longest durations of new shadow would continue to receive ample sunlight in the midday and afternoon, as there are no structures to the west. Most of Anable Basin would continue to receive several hours of direct sunlight in the spring, summer, and fall, and even the eastern end would receive at least 2 and a half hours of direct sun or more in these months. On the December 21 date, the western portions of Anable Basin would receive between two and six hours of direct sunlight, and portions in the eastern end between two hours to less than one hour.

As discussed in Chapter 9, “Natural Resources,” exposure to shadows can cause a decrease in light intensity, which can affect primary productivity within the shaded waters. Primary productivity (the rate at which solar energy and simple chemicals are converted to organic biomass through photosynthesis or chemosynthesis) within the aquatic study area is generated mainly from phytoplankton. However, light requirements for phytoplankton are low, and the reduction in light within the shadow footprint would have a negligible impact on phytoplankton populations. In addition, the current speeds of the East River in the vicinity are swift (2.5-3.0 knots) and would quickly carry any light-dependent phytoplankton through the newly shaded areas to areas outside the shadow exposure, limiting their exposure to shaded conditions to a relatively short period of time. Therefore, shadows resulting from the Proposed Actions would not be expected to have a significant adverse impact on primary productivity in the East River and Anable Basin.

Shading can also influence fish behavior and habitat use. Fish are generally less abundant in shaded areas under overwater structures compared to unshaded habitat. The avoidance of these shaded areas may be due to decreased visual performance which can impair feeding and predator avoidance. Such avoidance has the potential to disrupt movement and migration of some species. However, these changes in behavior and habitat use are typically observed with significant shading associated with piers and other overwater structures. Shadows, such as those cast by buildings along a shoreline, result in less reduction in light reaching the water surface than shading due to overwater structures, and affect different areas over the course of the day, further reducing the potential to affect aquatic biota. Fish would be expected to avoid areas where shadows temporarily resulted in low light but would have ample areas of the East River available for foraging and to maintain anadromous fish migration. The incremental shadows would therefore not have a significant effect on fish migration, or movement or spawning in the East River.

Anable Basin is a small extension of the East River with no upstream water source; the basin would not, therefore, serve as a migratory pathway for anadromous fish species. Due to the temporary nature of shadows on a particular portion of the basin, and the ability of fish to avoid low light levels, shadows resulting from the Proposed Actions would not have a significant effect on fish movement into and out of Anable Basin while foraging. Though portions of the basin could be in shadow during certain times of the day, Anable Basin is only expected to be used intermittently as foraging habitat. When considered with the abundance of foraging habitat available within the East River, any temporary reduction of suitable foraging habitat within Anable Basin would not result in significant adverse impacts to fish species of the Hudson-Raritan Estuary.

Spawning behavior for some fish species is triggered or affected by light intensity and could be affected by project-generated reduced light levels in Anable Basin. As discussed in Chapter 9, “Natural Resources,” the potential loss of some portion of the basin to spawning would represent a *de minimis* reduction of spawning habitat when compared to the amount of spawning habitat for all potentially spawning species available within the Hudson-Raritan Estuary. Other species that could potentially spawn in the study area, including winter flounder and windowpane flounder, are nighttime spawners and do not use high-light intensity as a spawning cue. Therefore, shadows cast by buildings resulting from the Proposed Actions would have no impact on their spawning behavior.

Any minor impacts on other fish behaviors associated with visual performance or light cues would be limited temporally to the hours in which incremental shadows are cast by the buildings associated with the Proposed Actions and limited spatially to the areas shaded by the buildings. Given the temporary nature of the shadows that would be cast and the continued availability of unshaded habitat in Anable Basin and the East River, as well as the migratory characteristic of the shadows on the East River, shadows would not result in significant adverse impacts to fish in the study area.

E. CONCLUSIONS

The shadows analysis concluded that new shadows resulting from the Proposed Actions would fall on dozens of sunlight-sensitive resources (primarily parks, pedestrian plazas, and Greenstreets medians) located in Long Island City, on Roosevelt Island, and on the East Midtown waterfront of Manhattan, but in the vast majority of cases the extent and/or duration of new shadow would be limited and would not cause significant adverse impacts. However, new shadows would be extensive enough to cause significant adverse impacts to three open space resources in Long Island City: several Greenstreets medians in Queens Plaza South between Vernon Boulevard and 13th Street; Gordon Triangle, a small public open space located on 44th Drive between Vernon Boulevard and 10th Street; and the 44th Drive Pier, a public open space located at the western end of 44th Drive. Potential measures to mitigate the significant adverse shadow impacts are discussed in Chapter 22, “Mitigation.” ✷